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Instructions: W0010049

Product: NCB alternator

Part no.: 0 124 5.. ..

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Continue: I01/2

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Continue: I01/1

## SPECIAL FEATURES

These instructions describe repair procedures and contain the corresponding test specifications for the following alternators

Part nos.:                      0 124 5.. ...  
                                  0 124 6.. ...

Type:                              NCB1 14V 120A  
                                  NCB1 14V 52-108A  
                                  NCB1 14V 70-120A  
                                  NCB2 14V 150A

Continue: I02/2

## SPECIAL FEATURES

### NOTE:

These repair instructions were compiled on the basis of the following alternator

Type:                              NCB1 -> 14V 70-120A  
Part no.:                              0 124 515 015

The different alternator versions can be seen from the appropriate parts lists.

Continue: I03/1

## SPECIAL FEATURES

Alternators of this type are equipped with a multi-function regulator.

Multi-function regulators feature the following:

- Voltage actual value and excitation current via connection B+
- Pre-excitation clocked via B+
- Connection/terminal L (recognition of ignition switch ON, fault display)
- Load response/starting (no supply of current during and immediately after starting; optional)

Continue: I03/2

## SPECIAL FEATURES

- Load response/driving (power supply constantly increased via ramp; optional)
- Connection/DF monitor (evaluation of current alternator load; optional)
- Connection/terminal S (battery "Sense", voltage signal directly from battery; optional)
- Thermal regulation of regulator voltage (optional)

Continue: I04/1

## SPECIAL FEATURES

### NOTE:

If checking with oscilloscope reveals that rectifier unit is OK, it is not necessary to separate rectifier unit/stator.

Never block fan and pulley with a screwdriver or the like when dismantling or assembling. Bent or damaged fan blades will cause damage to the alternator.

Continue: I04/2

## SPECIAL FEATURES

The entire assembly is geared to the alignment of the V-belt. Modifications or assembly errors can lead to damage.

Continue: I05/1

## SPECIAL FEATURES

The alternator housing is made of die-cast aluminum. Particular care is to be taken on dismantling and assembly as the housing is susceptible to damage. Deformation and surface damage may permanently impair the fit accuracy of the alternator components. This can result in damage to the alternator during operation.

Continue: I05/2

## SPECIAL FEATURES

After performing repairs, the function of the alternator is to be checked on a suitable test bench.

Continue: I06/1

## SPECIAL FEATURES

Explanatory notes on alternator  
labelling e.g.: NCB1 -> 14V 70-120A

N => Size

G = 100 ... 109	mm
K = 120 ... 129	mm
N = 130 ... 142	mm

C => Type of alternator  
Compact alternator

B => Design principle

l => Size classification

Continue: I06/2

## SPECIAL FEATURES

NCB1 -> 14V 70-120A

-> => Direction of rotation

->	or R	=	Clockwise
<-	or L	=	Counter- clockwise
<->	or RL	=	Clockwise and counter-clockwise

14V => Alternator voltage in volts

70- => Rated current in A measured at  
n = 1800 min<sup>-1</sup>

120A => Rated current in A measured at  
n = 6000 min<sup>-1</sup>

Continue: I01/1

## STRUCTURE, USAGE

PC user prompting:

Position cursor on button and confirm.

Microcard user prompting:

User prompting is provided on every page e.g.:

- Continue: I 17/1

- Continue: II 18/1      Fig.: II 17/2

Brief instructions may include several rows of coordinates.

I../. = first coordinate row

II../. = second coordinate row

III../. = third coordinate row

etc.

.../1 = upper coordinate half

.../2 = lower coordinate half

Continue: I01/1

## GENERAL

Expert repairs are only possible using the prescribed tools and measuring instruments, which are in perfect working order. We therefore recommend that exclusive use be made of the tools listed.

The use of incorrect and unsuitable tools and testers can lead to injury and may damage the product concerned or its component parts.

Continue: I08/2

## GENERAL

Exclusive use is to be made of service parts as per applicable parts list for type of alternator concerned.

To ensure proper functioning, use must be made of the materials prescribed in these instructions.

Ensure absolute cleanliness when performing repair work.

Continue: I09/1



## GENERAL

Tester and object being tested must be at room temperature for all checks performed during repair work.

The stated test values are referenced to a temperature of 20 C.

Continue: I01/1

## SAFETY MEASURES

### ATTENTION: DANGER OF FIRE

For transmitter and receiver interference suppression purposes, alternators are fitted with capacitors with a long storage time.

When washing out alternator components, immersion in cleaning fluid may result in capacitor discharge and cause flammable liquids to ignite.

Continue: I10/2

## SAFETY MEASURES

For this reason, components with capacitors are only to be washed out using cleaning agents (e.g. HAKU 1025/6) which are not readily flammable.

Continue: I11/1

## SAFETY MEASURES

Always heed the following safety regulations:

- \* German Order governing the use of flammable liquids (VbF).
  - \* Accident prevention regulations for electrical systems and equipment.
  - \* Safety regulations for the handling of chlorinated hydrocarbons:
    - For companies: ZH 1/222
    - For employees: ZH 1/129
- issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

Continue: I11/2

## SAFETY MEASURES

Outside Germany, pay attention to appropriate local regulations.

Skin protection:

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

Continue: I01/1

TESTERS, FIXTURES, TOOLS

Testers, measuring instruments

Alternator tester: 0 684 201 200  
(WPG 012.00)

Interturn short circuit tester: 0 986 619 110

Test prods:  
(old version 0 986 619 101  
0 986 619 114)

Universal measuring instrument MMD 302: 0 984 500 302  
or  
Electrical system tester: 0 684 101 400  
(ETE 014.00)

Continue: I12/2

TESTERS, FIXTURES, TOOLS

Testers, measuring instruments

Dial gauge: 1 687 233 011

Magnetic measurement stand: 4 851 601 124  
(T-M 1)

Two V-blocks: comm. avail.

Continue: I13/1

TESTERS, FIXTURES, TOOLS

Tools, fixtures

Socket wrench: 0 986 618 152  
(KDLJ 6030)

Disassembly tool: 0 986 619 396

M10 multi-point socket,  
long version: comm. avail.

Support piece and  
pressing-in sleeve: 0 986 618 162  
(KDLJ 6044)

Mandrel press: comm. avail.

Continue: I13/2

TESTERS, FIXTURES, TOOLS

Tools, fixtures

Two-arm puller: comm. avail.

Torque wrench: comm. avail.

Soldering iron 180 W: comm. avail.

High-temperature solder  
(min. 480 C): comm. avail.

Solder cream: comm. avail.

Continue: I01/1

## TEST SPECIFICATIONS

### Mechanical test specifications

#### Diameter of collector rings

New: 15,6 mm

Min.: 14,9 mm

#### Max. radial run-out of collector rings:

0,03 mm

#### Max. radial run-out at rotor OD:

0,05 mm

#### Carbon brush projection at regulator

New: 13,2 mm

Min.: 6 mm

Continue: I14/2

## TEST SPECIFICATIONS

### Electrical test specifications

#### Interference-suppression

capacitor: 2,0...2,4 microfarads

Stator resistance: < 0,1 Ohm

Rotor resistance: 1,8...2,8 Ohm

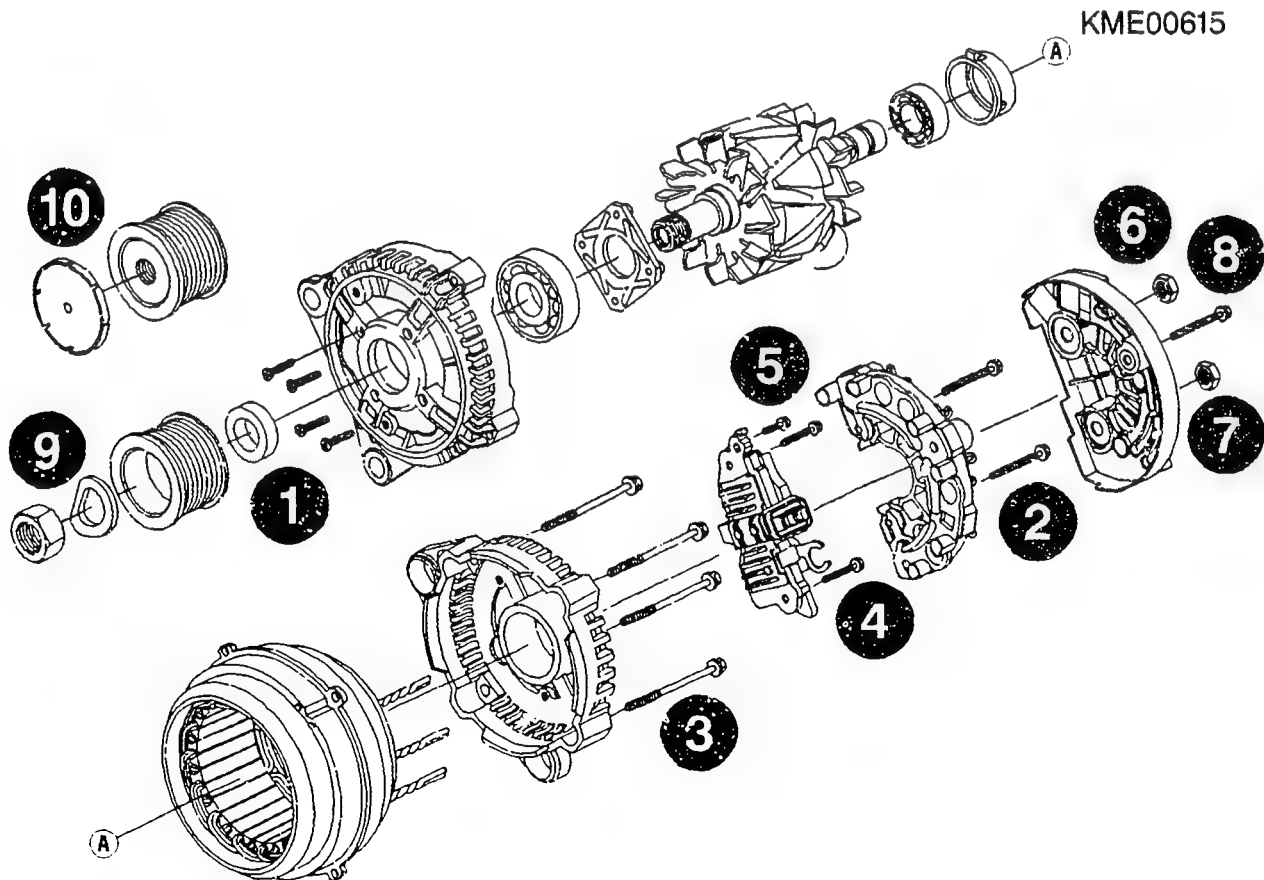
Continue: I01/1

# TIGHTENING TORQUES

Tightening torques for attachment of

1 = Cover plate:	2,7...3,5	Nm
2 = Rectifier unit:	3,5...4,3	Nm
3 = End shields:	4,5...5,5	Nm
4 = Regulator:	1,6...2,3	Nm
5 = Connection V:	0,9...1,4	Nm
6 = Long B+:	18...20	Nm
7 = Short B+:	11...13	Nm
8 = Protective cap:	3,5...4,3	Nm
9 = Pulley:	60...70	Nm
10 = Free-wheel pulley:	75...85	Nm

Continue: I01/1 Fig.: I15/2



# CIRCUIT DIAGRAM

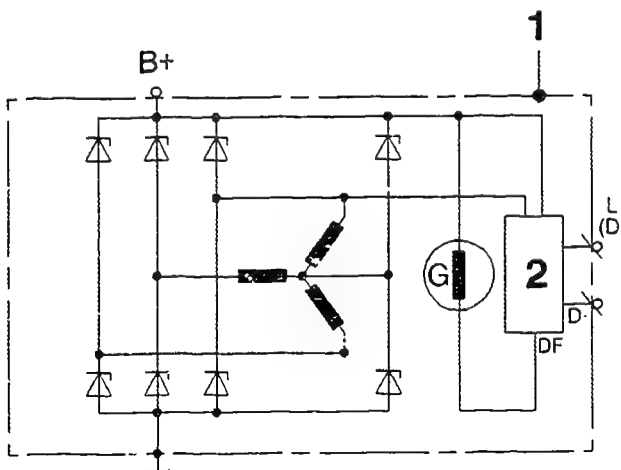
Rectifier unit version 1

1 = Alternator

2 = Regulator

Continue: I17/1 Fig.: I16/2

KME00607





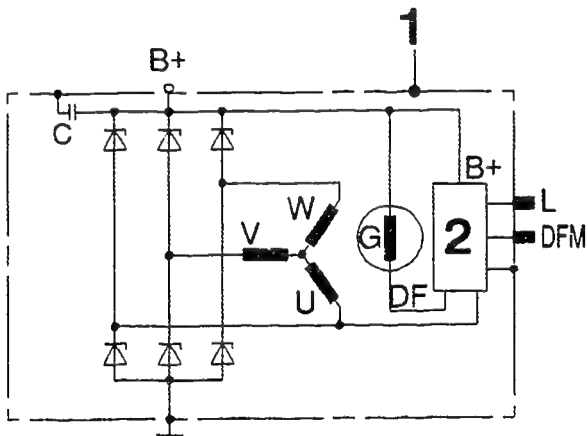
# CIRCUIT DIAGRAM

## Rectifier unit version 2

- 1 = Alternator
- 2 = Regulator

Continue: I18/1 Fig.: I17/2

KME00608



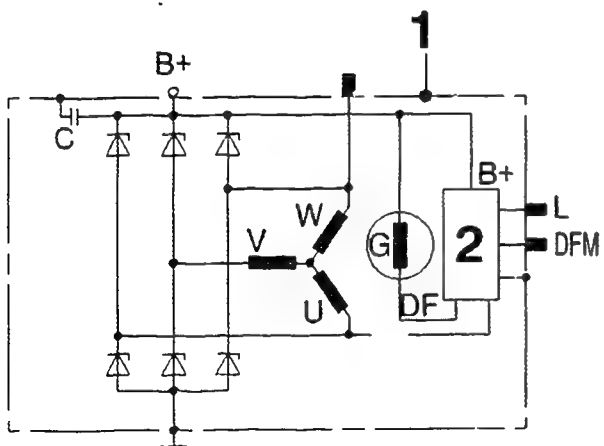
# CIRCUIT DIAGRAM

Rectifier unit version 3

1 = Alternator  
2 = Regulator

Continue: I19/1 Fig.: I18/2

KME00609



# CIRCUIT DIAGRAM

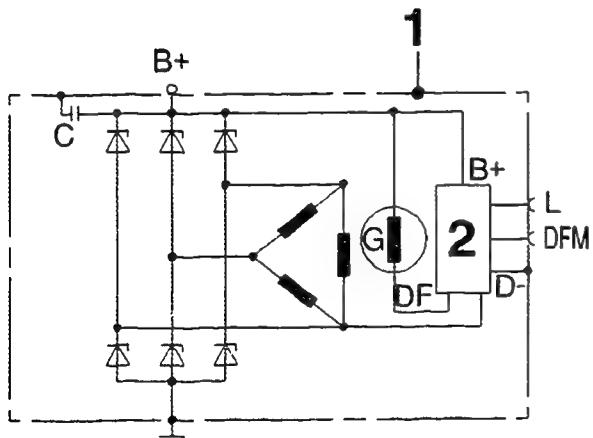
Rectifier unit version 4

1 = Alternator

2 = Regulator

Continue: I20/1 Fig.: I19/2

KME00610



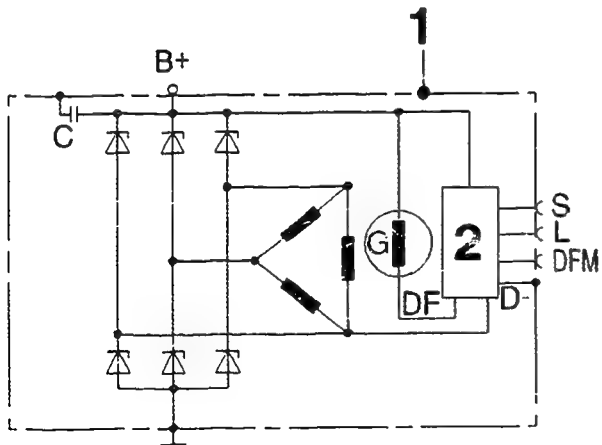
# CIRCUIT DIAGRAM

## Rectifier unit version 5

- 1 = Alternator
- 2 = Regulator

Continue: I21/1 Fig.: I20/2

KME00661



# CIRCUIT DIAGRAM

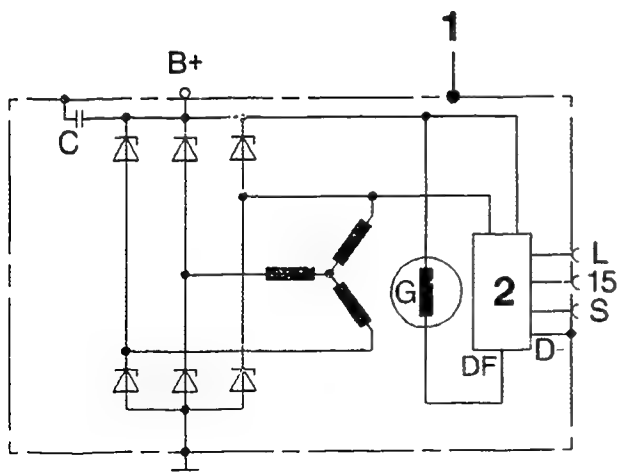
Rectifier unit version 6

1 = Alternator

2 = Regulator

Continue: I01/1 Fig.: I21/2

KME00662



ALTERNATOR DISASSEMBLY/CHECKING  
TABLE

Disassembling pulley	I23/1
Disassembling protective cap	I27/1
Disassembling regulator	II02/1
Checking (installed) rectifier unit	II04/1
Checking (installed) stator	II06/1
Disassembling drive end shield	II07/1
Disassembling rotor	II10/1
Disassembling deep-groove ball bearing of drive end shield	II12/1

Continue: I22/2

ALTERNATOR DISASSEMBLY/CHECKING  
TABLE

Disassembling deep-groove ball bearing of collector ring end shield	II15/1
Disassembling rectifier unit	II17/1
Disassembling stator	II21/1

Continue: I01/1

# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling pulley

Remove cap (1) of pulley (2).

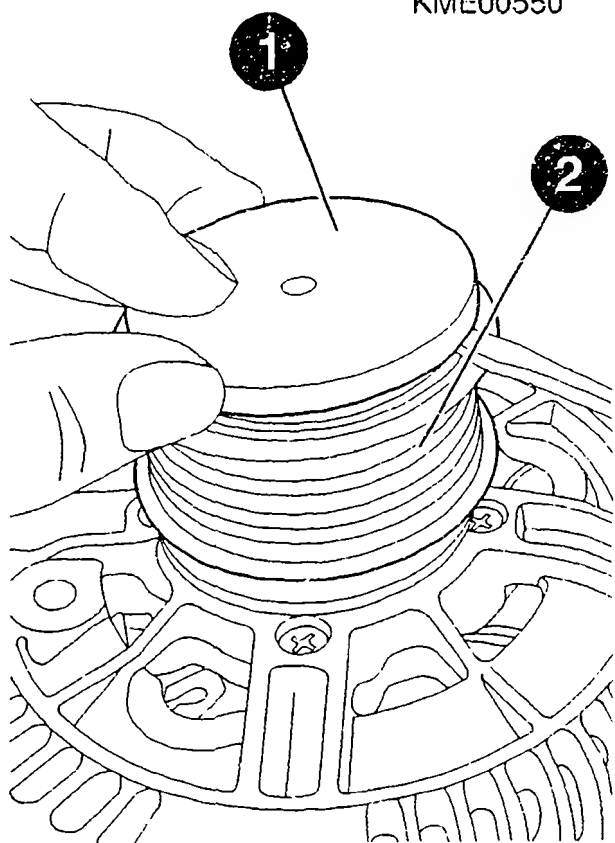
### NOTE:

Cap is either pressed in or clipped on.

Clip-on cap can be removed using a suitable tool.

Continue: I24/1 Fig.: I23/2

KME00550



# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling pulley

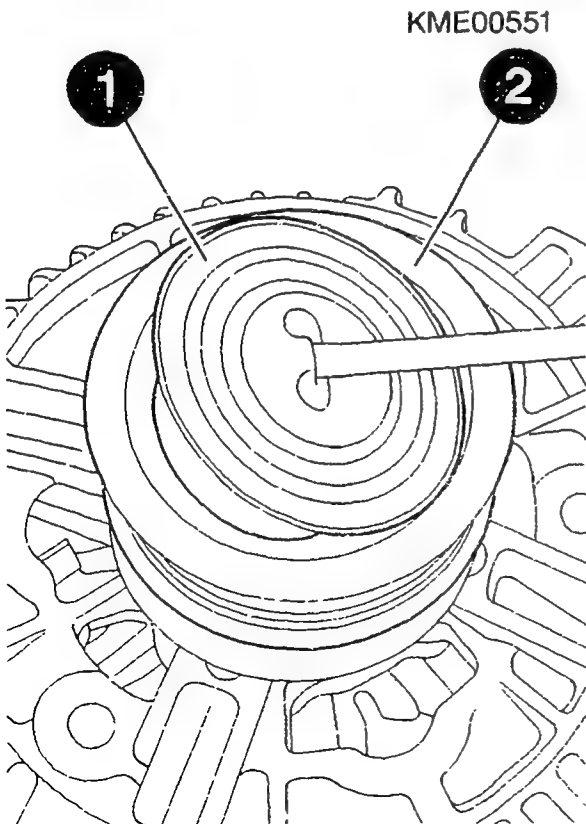
Remove cap (1) of pulley (2).

### NOTE:

Cap is either pressed in or clipped on.

A pressed-in cap can only be removed by piercing it and prising it out.

Continue: I25/1 Fig.: I24/2





# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling pulley

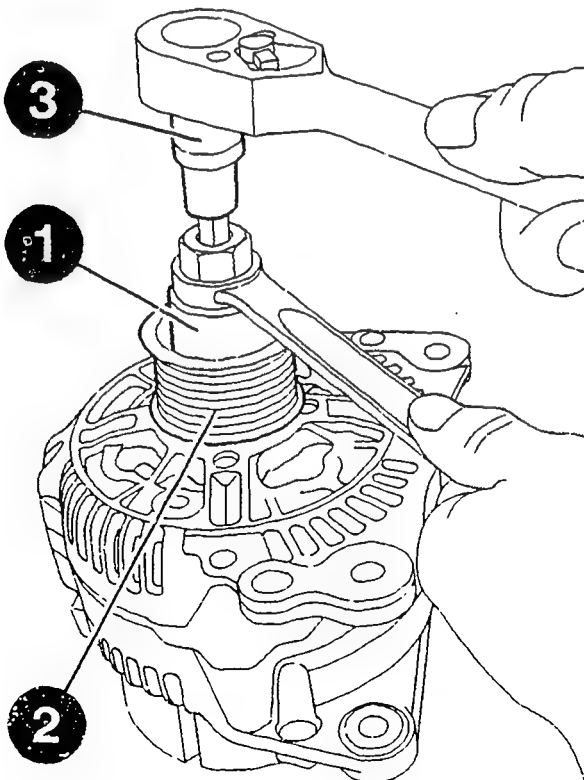
Attach socket wrench (1) to nut of pulley (2). Hold rotor shaft of alternator with multi-point wrench (3) and unfasten nut using 22 mm box wrench.

Detach pulley and spring lock washer.

Socket wrench:	0 986 618 152
M10 multi-point socket, long version:	comm. avail.

Continue: I26/1 Fig.: I25/2

KME00552



## DISASSEMBLING AND CHECKING ALTERNATOR

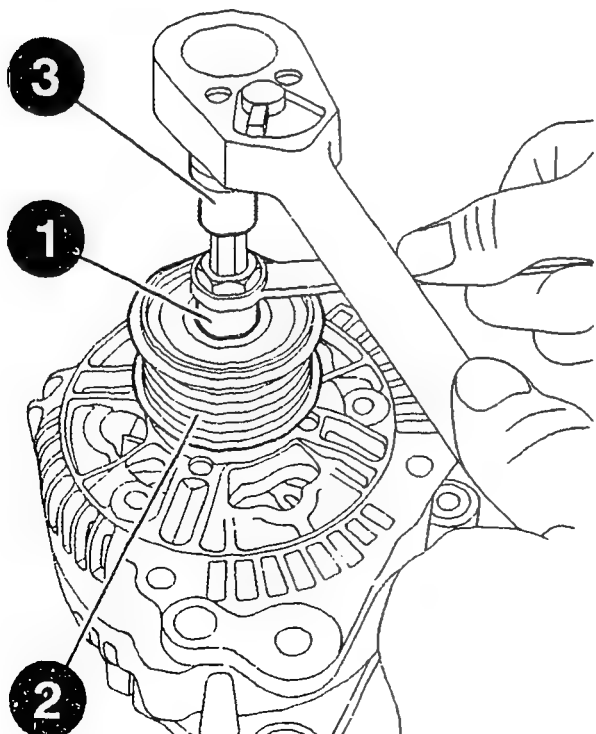
### Disassembling pulley (free-wheel pulley)

Insert disassembly tool (1) in grooved tothing of free-wheel pulley (2). Hold rotor shaft of alternator with multi-point wrench (3), unfasten free-wheel pulley by means of disassembly tool using 17 mm box wrench and detach.

Disassembly tool:	0 986 619 396
M10 multi-point socket, long version:	comm. avail.

Continue: I22/1 Fig.: I26/2

KME00553



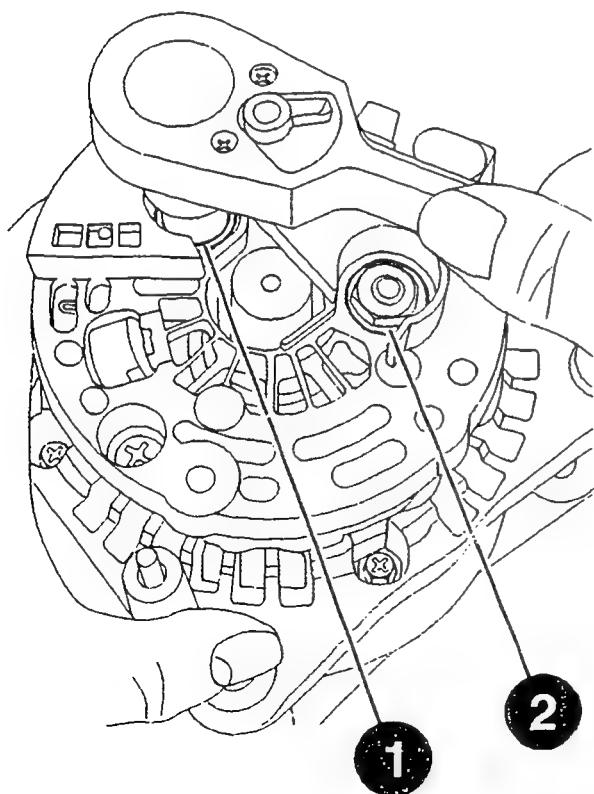
# DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling protective cap

Unfasten long B+ (1) and short B+ (2) connections.

Continue: I28/1 Fig.: I27/2

KME00616



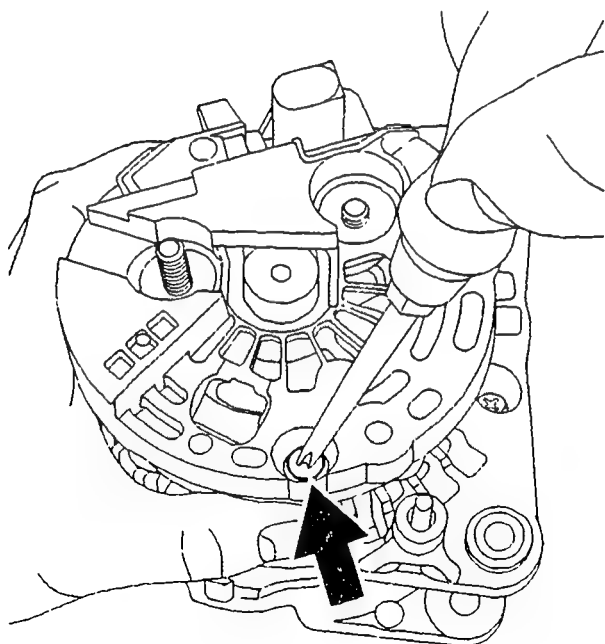
# DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling protective cap

Unscrew bolt (arrow) of protective cap.

Continue: I101/1 Fig.: I28/2

KME00617



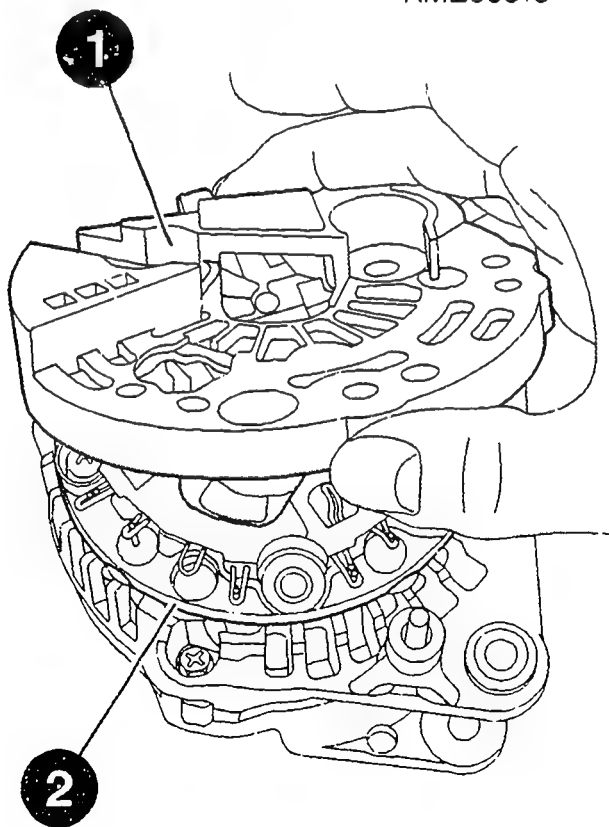
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling protective cap

Detach protective cap (1) from collector ring end shield and rectifier unit (2).

Continue: I22/1 Fig.: II01/2

KME00618



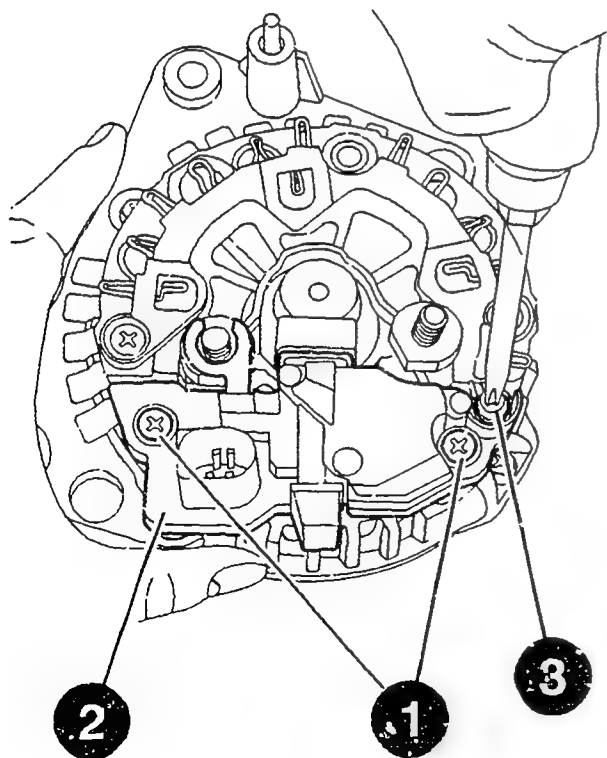
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling regulator

Unfasten and remove bolts (1) of regulator (2) and connection V (3).

Continue: II03/1 Fig.: II02/2

KME00619



# DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling regulator

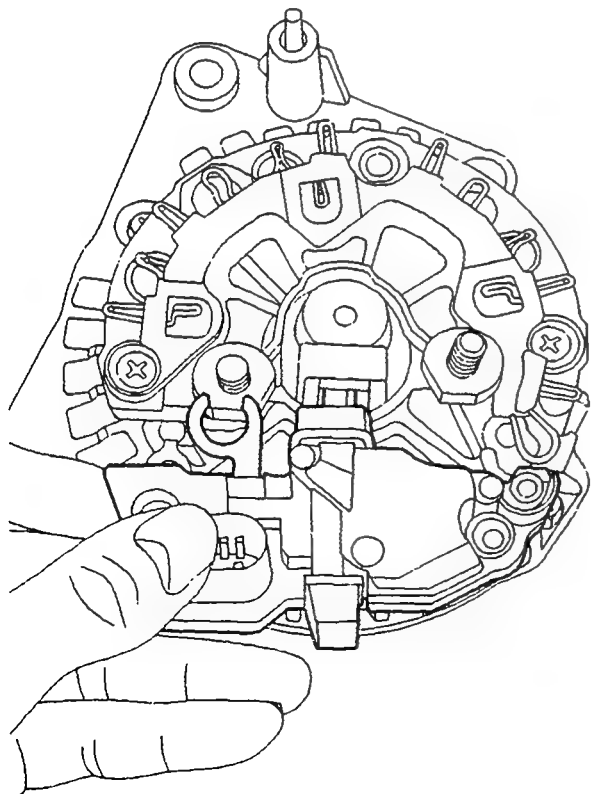
Detach regulator.

**ATTENTION:**

Take care not to damage carbon brushes.

Continue: I22/1 Fig.: II03/2

KME00620



## DISMANTLING AND CHECKING ALTERNATOR

Checking (installed) rectifier

### GENERAL:

- \* Pointer of measuring instrument must be in green band for this test.
- \* Renew entire rectifier if one or more diodes defective.

Continue: II04/2

## DISMANTLING AND CHECKING ALTERNATOR

- \* To ensure proper functioning of rectifier, alternator is to be checked on test bench or diodes checked individually with rectifier removed.

Continue: II05/1



## DISASSEMBLING AND CHECKING ALTERNATOR

### Checking (installed) rectifier unit

Check function of rectifier unit when connected to alternator tester. Pay attention to switch setting "ASSEMBLY" on tester.

Measurement points between:

\* Housing (1) and stator connections (2)

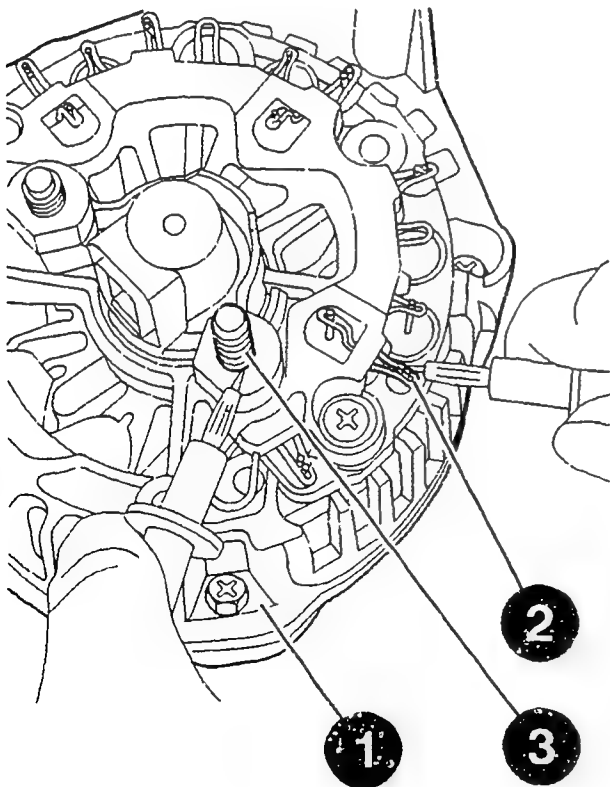
\* Long B+ (3) and stator connections

Alternator tester:

0 684 201 200

Continue: I22/1 Fig.: II05/2

KME00621



# DISASSEMBLING AND CHECKING ALTERNATOR

## Checking (installed) stator

Check resistance between the corresponding winding ends.

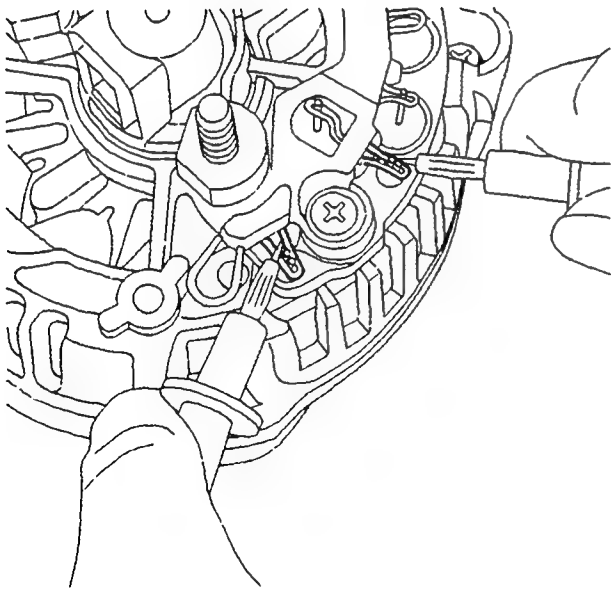
Pay attention to switch setting on alternator tester.

Heed measuring range on tester.

Stator resistance:	< 0,1 Ohm
Alternator tester:	0 684 201 200

Continue: I22/1 Fig.: I106/2

KME00622



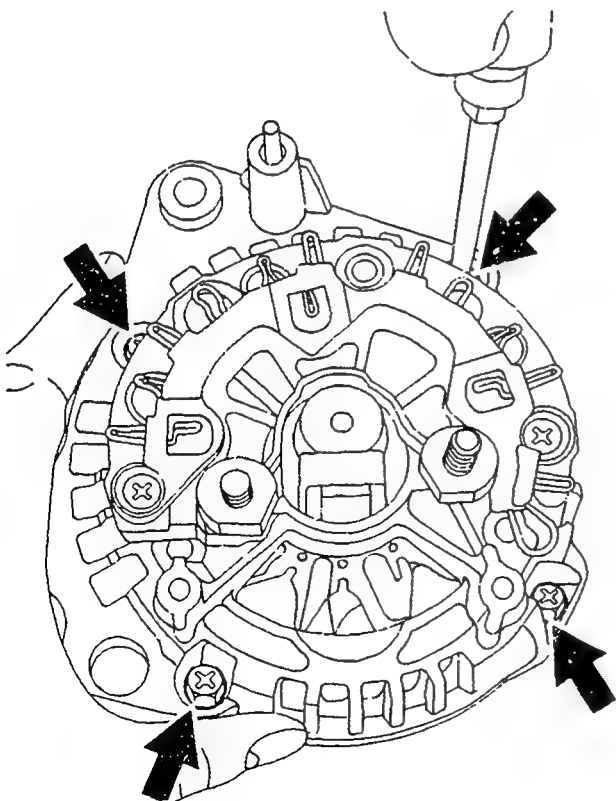
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling drive end shield

Unfasten and remove four hexagon bolts (arrows).

Continue: II08/1 Fig.: II07/2

KME00623



# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling drive end shield

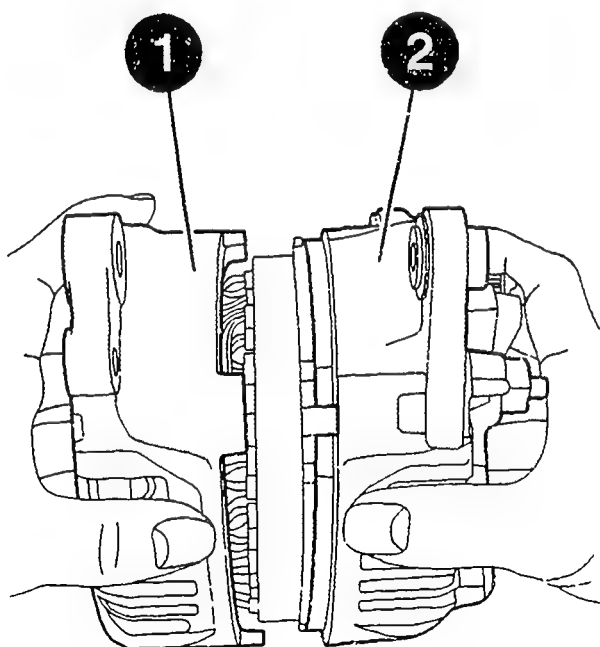
Pull drive end shield with rotor (1) out of collector ring end shield (2).

### Note:

If necessary, separate drive end shield and collector ring end shield by tapping carefully with rubber-headed hammer.

Continue: II09/1 Fig.: II08/2

KME00624



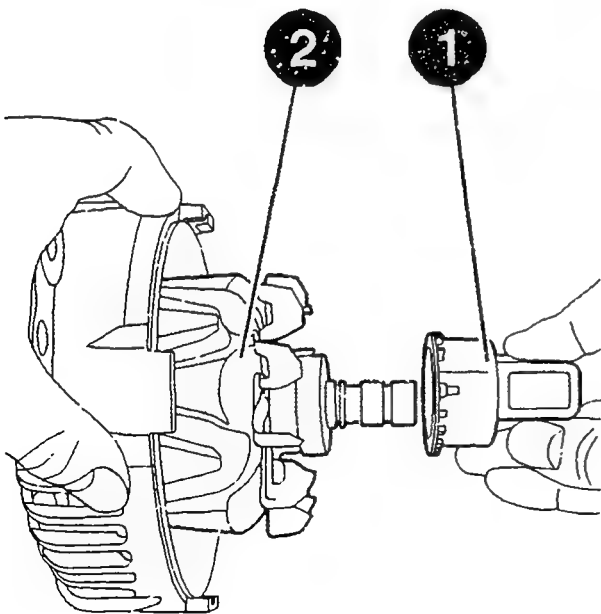
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling drive end shield

Detach fitting ring (1) from rotor shaft (2).

Continue: I22/1 Fig.: I109/2

KME00625



# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling rotor

Position collector ring end of drive end shield with rotor (1) in support piece (2).

Use extraction tool (3) to pull drive end shield off rotor.

### NOTE:

When applying extraction tool, it may be necessary to fit a separate puller arm. Apply puller arms at bearing seat of drive end shield.

Take care not to damage fan blades.

Support piece:

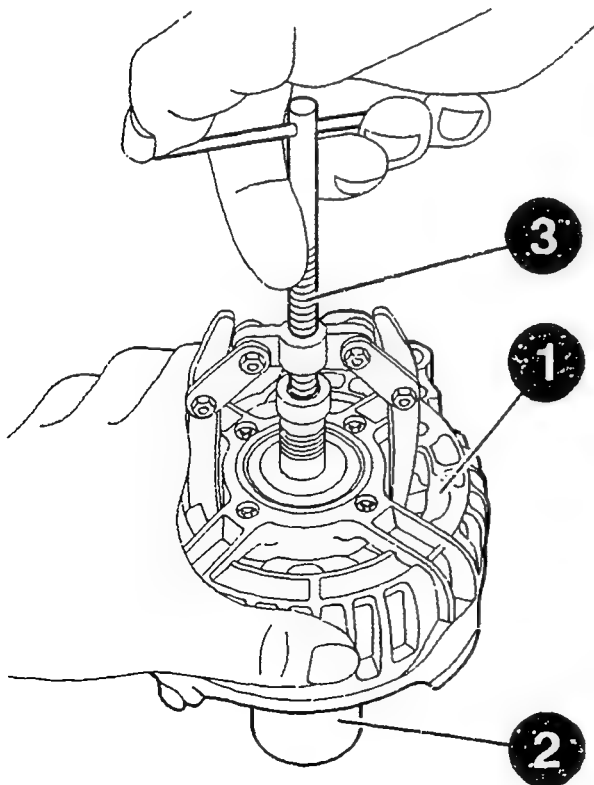
0 986 618 162

Extraction tool:

comm. avail.

Continue: II11/1 Fig.: II10/2

KME00626



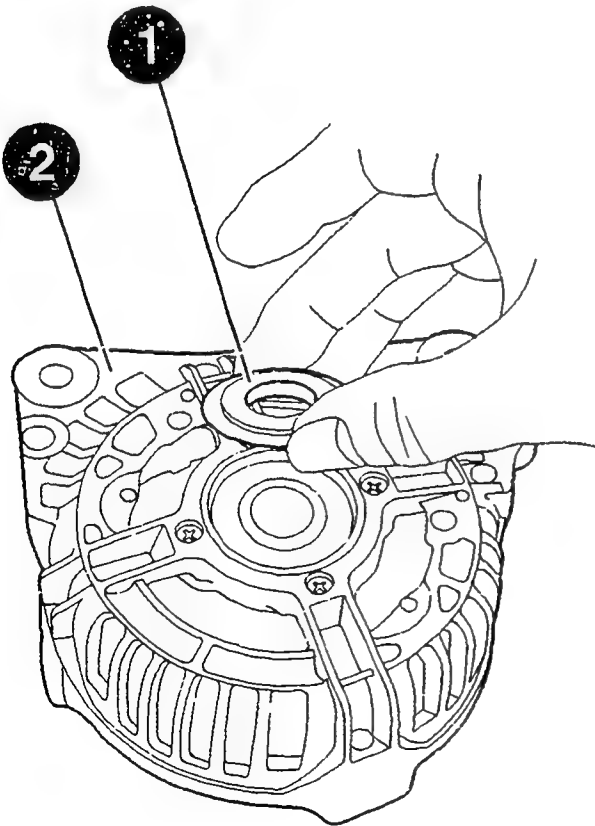
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling rotor

Detach spacer ring (1) from drive end shield (2).

Continue: I22/1 Fig.: I111/2

KME00627



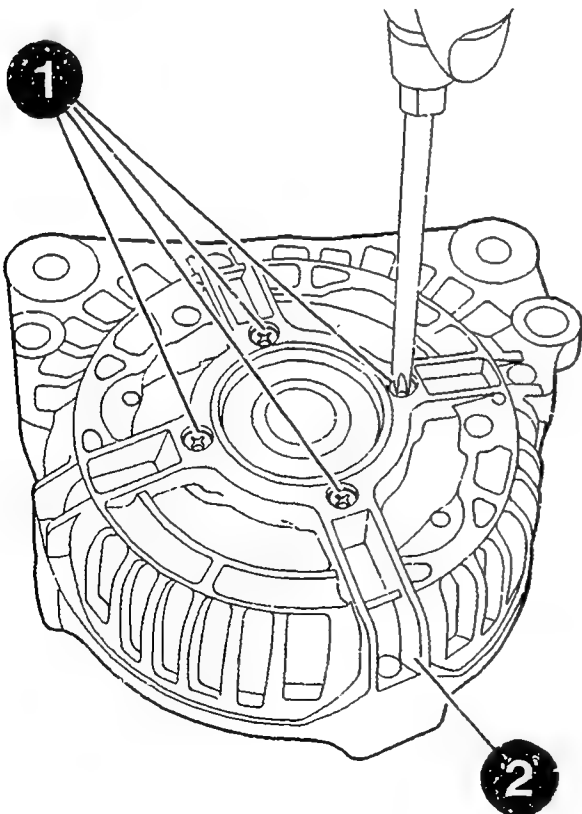
## DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of drive end shield

Unfasten four bolts (1) of drive end shield (2).

Continue: II13/1 Fig.: II12/2

KME00628





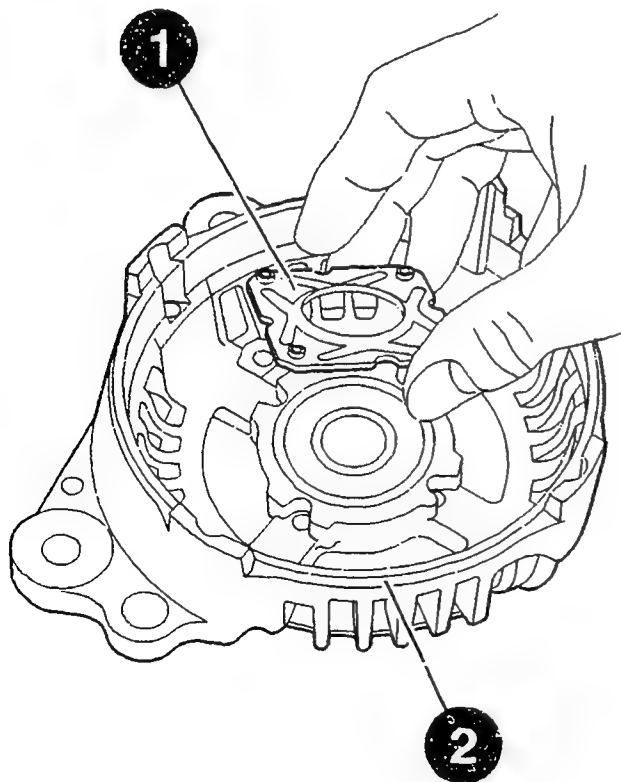
## DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of drive end shield

Detach cover plate (1) from drive end shield (2).

Continue: II14/1 Fig.: II13/2

KME00629



## DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of drive end shield

Place drive end shield (1) on press and press deep-groove ball bearing (2) with pressing-in sleeve (3) out of drive end shield.

Mandrel press:

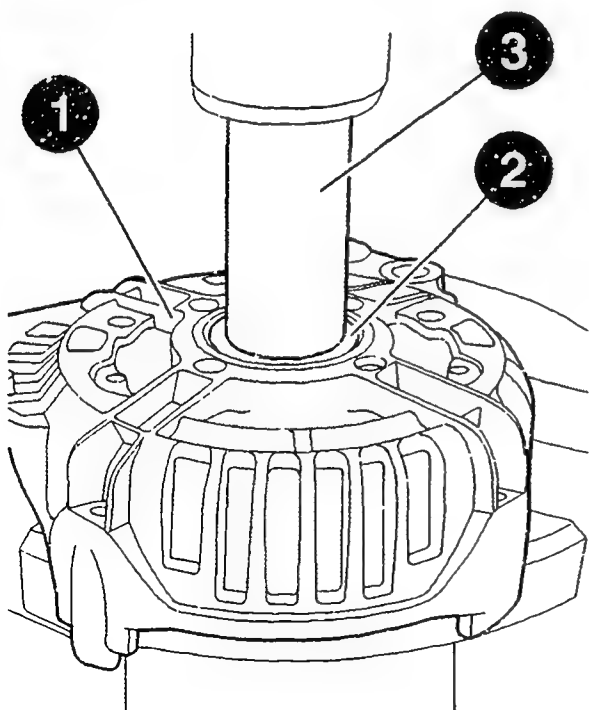
comm. avail.

Pressing-in sleeve:

0 986 618 162

Continue: I22/1 Fig.: II14/2

KME00630



## DISASSEMBLING AND CHECKING ALTERNATOR

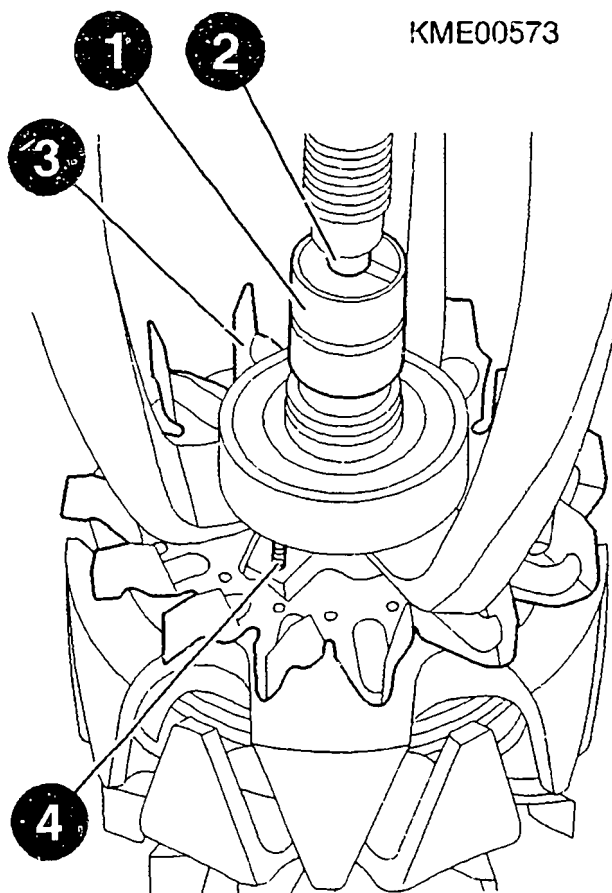
Disassembling deep-groove ball bearing of collector ring end shield

### ATTENTION:

So as to avoid breaking collector ring assembly (1), pressing-off mandrel (2) must be applied to rotor shaft and never to actual collector ring assembly.

When pulling off, take care not to damage fan blades (3) and electrical connections (4) by turning claws of extraction tool.

Continue: II16/1 Fig.: II15/2



## DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of collector ring end shield

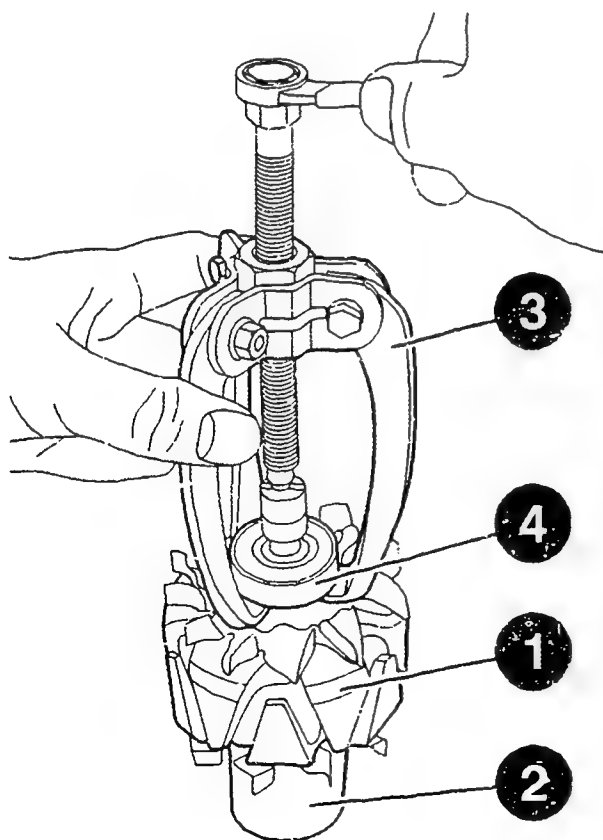
Position drive end of rotor (1) in support piece (2).  
Use extraction tool (3) to pull deep-groove ball bearing (4) off rotor shaft.

Support piece:  
Extraction tool:

0 986 618 162  
comm. avail.

Continue: I22/2 Fig.: II16/2

KME00631



## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling rectifier unit

#### NOTE:

If checking with oscilloscope reveals that rectifier unit is OK, it is not necessary to separate rectifier unit/stator.

Continue: II18/1

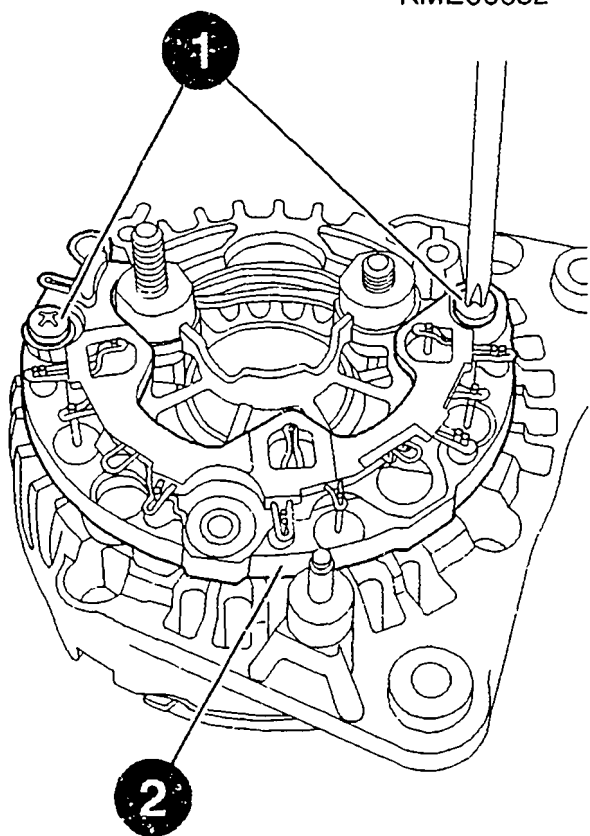
# DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling rectifier unit

Remove bolts (1) of rectifier unit (2).

Continue: II19/1 Fig.: II18/2

KME00632



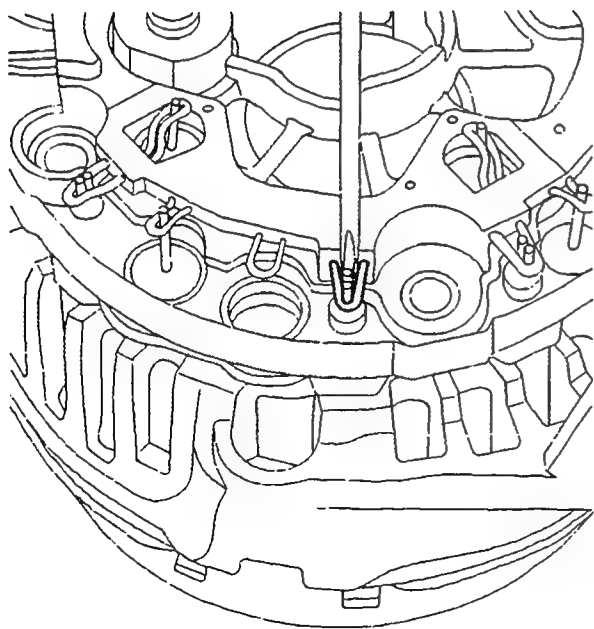
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling rectifier unit

Use suitable tool to carefully open all stator wire holders and detach stator wires.

Continue: II20/1 Fig.: II19/2

KME00633



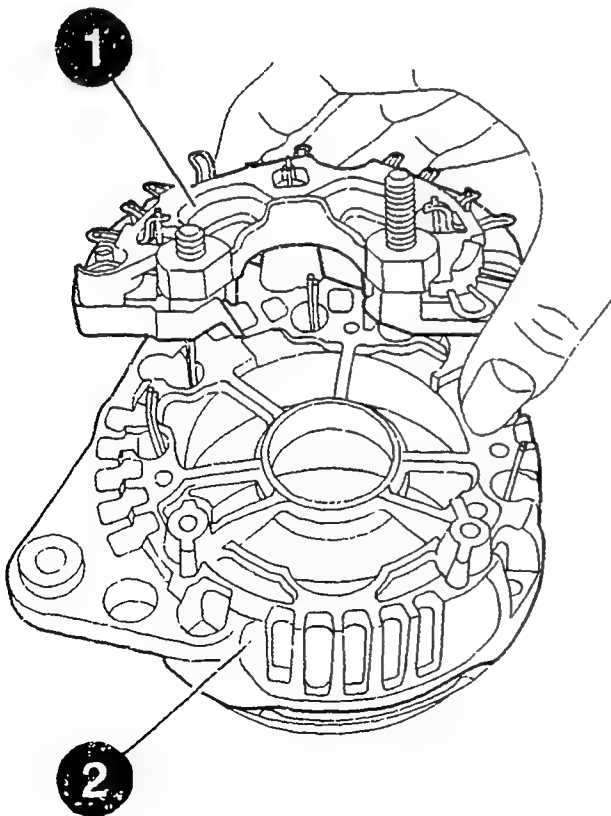
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling rectifier unit

Detach rectifier unit (1) from collector ring end shield (2).

Continue: I22/2 Fig.: I120/2

KME00634





# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling stator

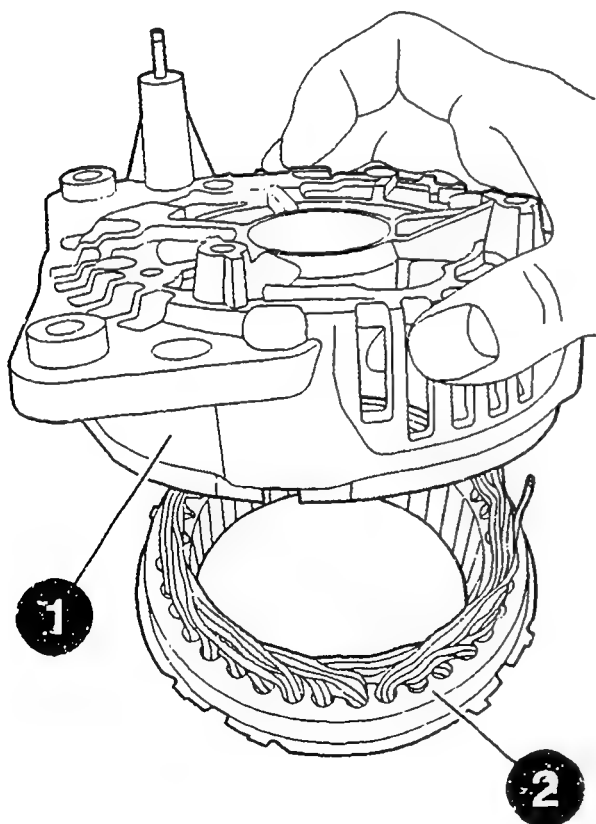
Lift collector ring end shield (1) off stator (2).

### NOTE:

If necessary, separate stator and collector ring end shield by tapping carefully with a rubber-headed hammer.

Continue: I01/1 Fig.: II21/2

KME00635



## COMPONENT CLEANING

### ATTENTION: DANGER OF FIRE

For transmitter and receiver interference suppression purposes, alternators are fitted with capacitors with a long storage time.

When washing out alternator components, immersion in cleaning fluid may result in capacitor discharge and cause flammable liquids to ignite.

Continue: II22/2

## COMPONENT CLEANING

For this reason, components with capacitors are only to be washed out using cleaning agents (e.g. HAKU 1025/3) which are not readily flammable.

Continue: II23/1

## COMPONENT CLEANING

Always heed the following safety regulations:

- \* German Order governing the use of flammable liquids (VbF).
  - \* Accident prevention regulations for electrical systems and equipment.
  - \* Safety regulations for the handling of chlorinated hydrocarbons:
    - For companies: ZH 1/222
    - For employees: ZH 1/129
- issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

Continue: II23/2

## COMPONENT CLEANING

Outside Germany, pay attention to appropriate local regulations.

Skin protection:

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

Continue: I01/1

# ALTERNATOR CHECKING/REPAIR TABLE

Checking regulator and carbon brushes	II25/1
Checking (removed) rectifier unit	II26/1
Checking interference suppression capacitor	II28/1
Checking (removed) stator	III01/2
Checking rotor (short to ground)	III03/1
Checking rotor (resistance)	III05/1
Checking rotor (concentricity)	III06/1
Replacing fitting ring in collector ring end shield	III08/1

Continue: I01/1

# CHECKING AND REPAIRING ALTERNATOR

## Checking regulator and carbon brushes

Check regulator for external damage. Replace regulator if carbon brushes have broken off or if projection "a" is less than 6 mm.

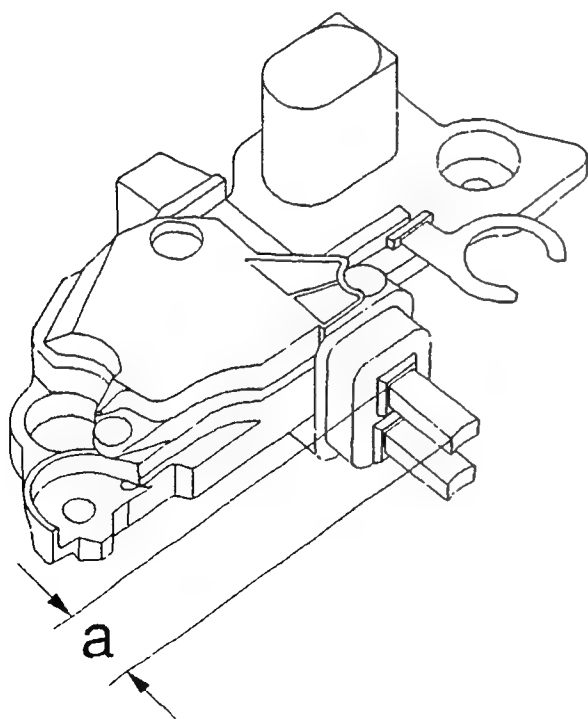
Check freedom of movement of carbon brushes.

### Projection of carbon brushes

New:	13,2 mm
Min.:	6 mm

Continue: II24/1 Fig.: II25/2

KME00636



## CHECKING AND REPAIRING ALTERNATOR

Checking (removed) rectifier unit

### GENERAL:

- \* Checking of the individual diodes must be performed to ensure proper functioning of the rectifier unit.
- \* The diodes are to be checked in both forward and reverse direction.

Continue: II26/2

## CHECKING AND REPAIRING ALTERNATOR

- \* Pointer of measuring instrument must be in green zone when checking in forward direction.
- \* Pointer of measuring instrument must be in red zone when checking in reverse direction.

Continue: II27/1

# CHECKING AND REPAIRING ALTERNATOR

## Checking (removed) rectifier unit

Heed general notes.

Check function of rectifier unit with alternator tester.

Pay attention to switch setting "INDIVIDUAL CHECK" on tester.

Measurement points between:

\* Long B+ (1) and diode connections (2)

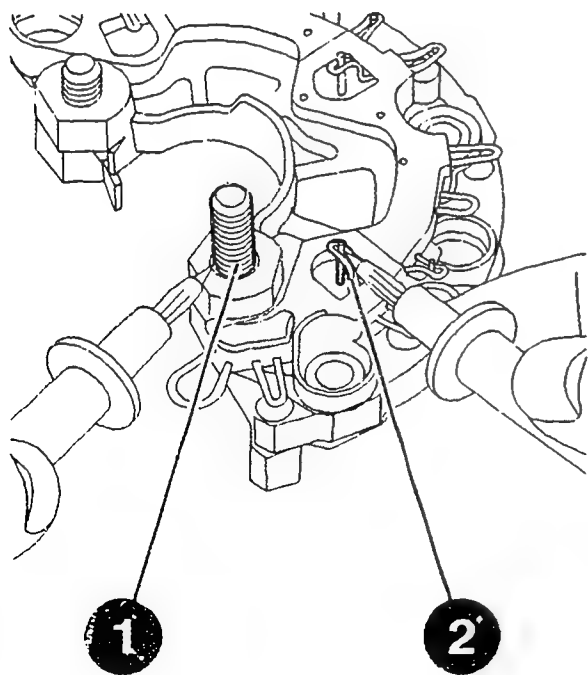
\* Diode housing and diode connections

Alternator tester:

0 684 201 200

Continue: II24/1 Fig.: II27/2

KME00637



## CHECKING AND REPAIRING ALTERNATOR

### Checking interference suppression capacitor

Interference suppression capacitor is located in protective cap.

Measure capacitance of capacitor between B+ (1) and terminal lug (2).

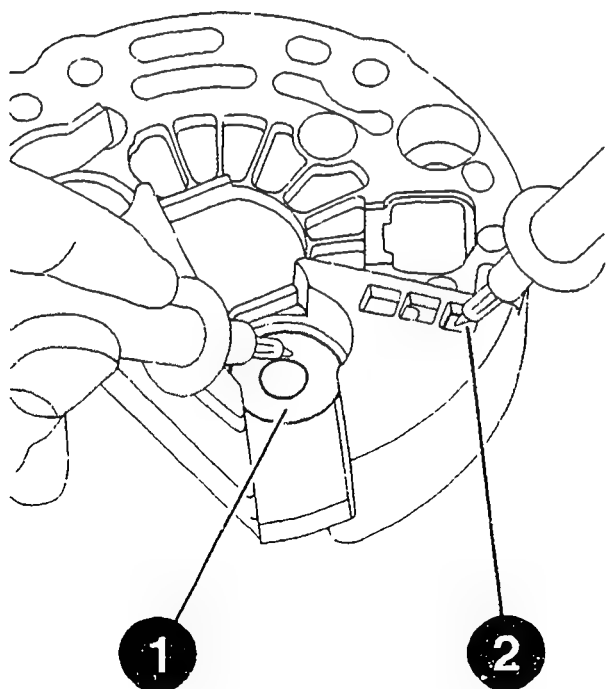
If set value is not attained, replace defective interference suppression capacitor with protective cap.

Set value: 2,0...2,4 microfarads

Electrical system tester: 0 684 101 400

Continue: III01/1 Fig.: II28/2

KME00638





## CHECKING AND REPAIRING ALTERNATOR

Checking interference suppression capacitor

### ATTENTION:

After checking, short and discharge interference suppression capacitor to prevent ignition of cleaning fluid when cleaning components.

Continue: II24/1

## CHECKING AND REPLACING ALTERNATOR

Checking (removed) stator

### ATTENTION:

Voltages of 80 V are POTENTIALLY FATAL.

When performing this check, it is imperative to ensure proper handling of the stator and all parts in electrical contact with it.

Continue: III02/1

# CHECKING AND REPAIRING ALTERNATOR

## Checking (removed) stator

Use test prods (1) to check stator for short to ground between housing (2) and winding ends (3).

Replace stator if defective.

Test voltage: 80 V AC

Interturn short-circuit  
tester:

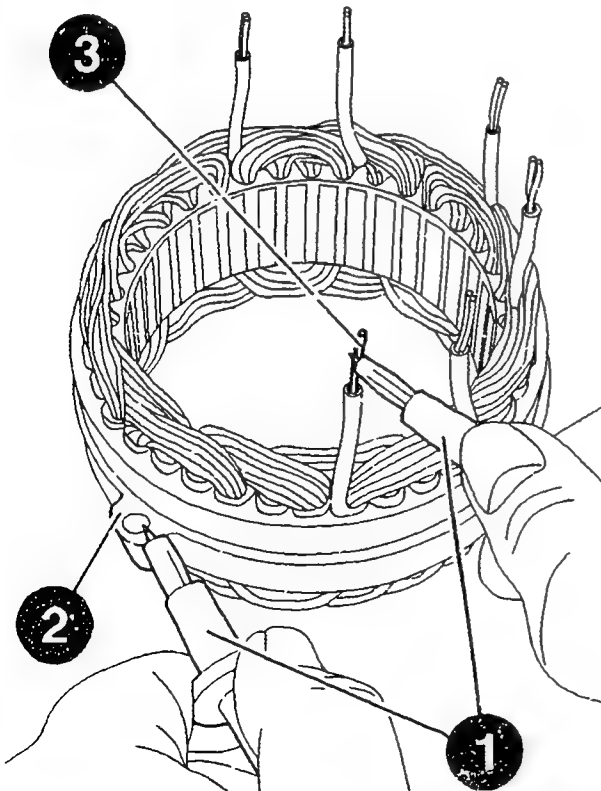
0 986 619 110

Test prods:

0 986 619 101

Continue: II24/1 : Fig.: III02/2

KME00577



## CHECKING AND REPLACING ALTERNATOR

Checking rotor (short to ground)

### ATTENTION:

Voltages of 80 V are POTENTIALLY FATAL.

When performing this check, it is imperative to ensure proper handling of the rotor and all parts in electrical contact with it.

Continue: III04/1

# CHECKING AND REPAIRING ALTERNATOR

## Checking rotor (short to ground)

Use interturn short-circuit tester and test prods to check rotor for short to ground between collector ring (1) and rotor OD (2).

Test voltage: 80 V AC

Interturn short-circuit  
tester:

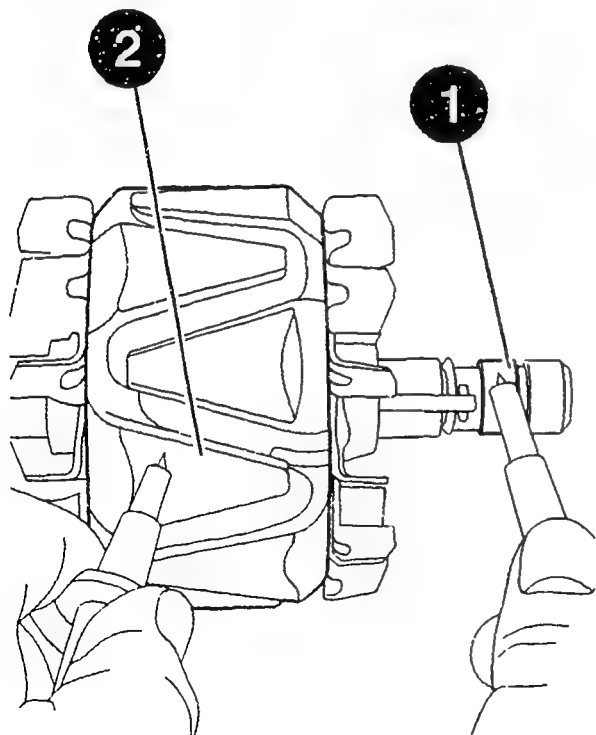
0 986 619 110

Test prods:

0 986 619 101

Continue: II24/1 Fig.: III04/2

KME00578



# CHECKING AND REPAIRING ALTERNATOR

## Checking rotor (resistance)

Use alternator tester to measure rotor resistance between collector rings.

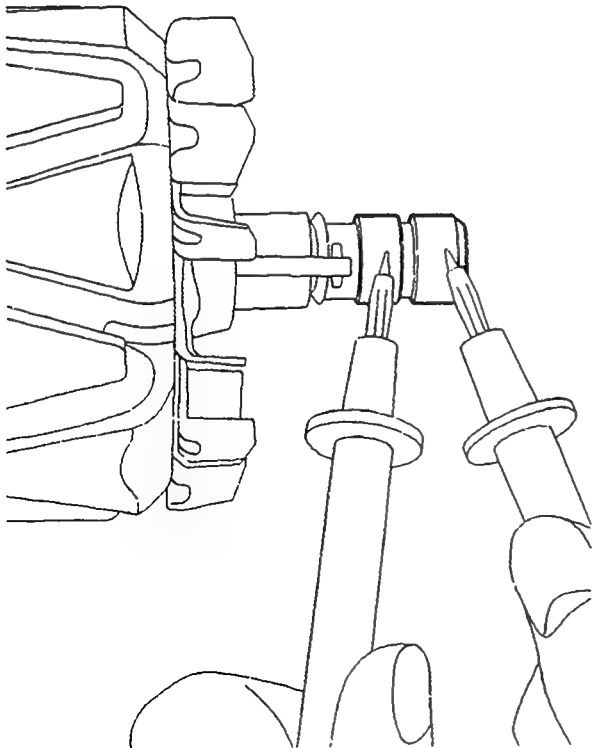
Observe measuring range on tester.

Resistance value: 1,8...2,8 Ohm

Alternator tester: 0 684 201 200

Continue: II24/1 Fig.: III05/2

KME00579



# CHECKING AND REPAIRING ALTERNATOR

## Checking rotor (concentricity)

Position mounting points of rotor in V-blocks and perform precise horizontal alignment. Measure concentricity at OD of rotor with magnetic measurement stand and dial gauge.

Max. radial run-out at rotor OD:

0,05 mm

Two V-blocks:

comm. avail.

Dial gauge:

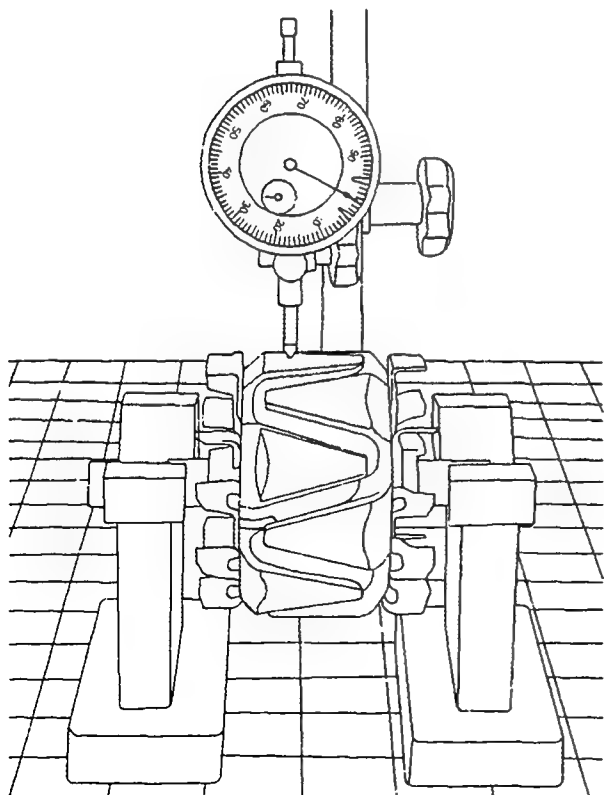
1 687 233 011

Magnetic measurement stand:

4 851 601 124

Continue: III07/1 Fig.: III06/2

KME00580



## CHECKING AND REPAIRING ALTERNATOR

### Checking rotor (concentricity)

Measure concentricity at collector rings.

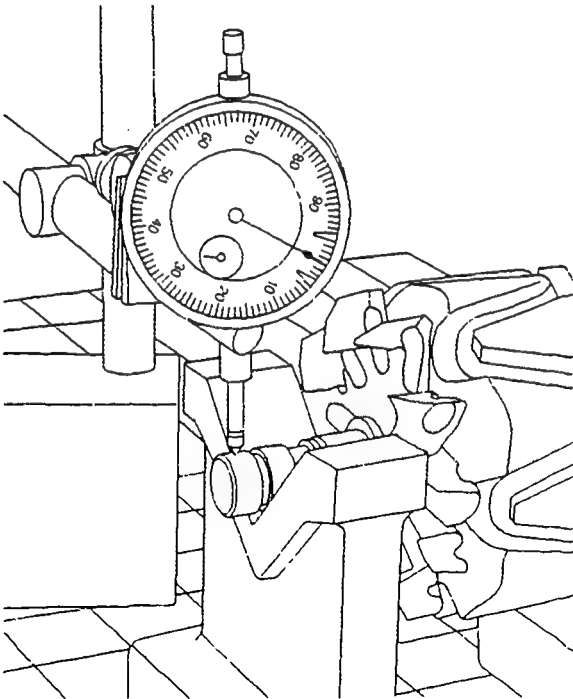
Max. radial run-out of collector rings: 0,03 mm

In the event of greater deviation or worn surface, turn down collector rings or renew rotor.  
Pay attention to minimum diameter.

Min. diameter of collector rings: 14,9 mm

Continue: II24/1 Fig.: III07/2

KME00581



## CHECKING AND REPAIRING ALTERNATOR

Replacing fitting ring in collector ring end shield

Fitting ring is always to be replaced.

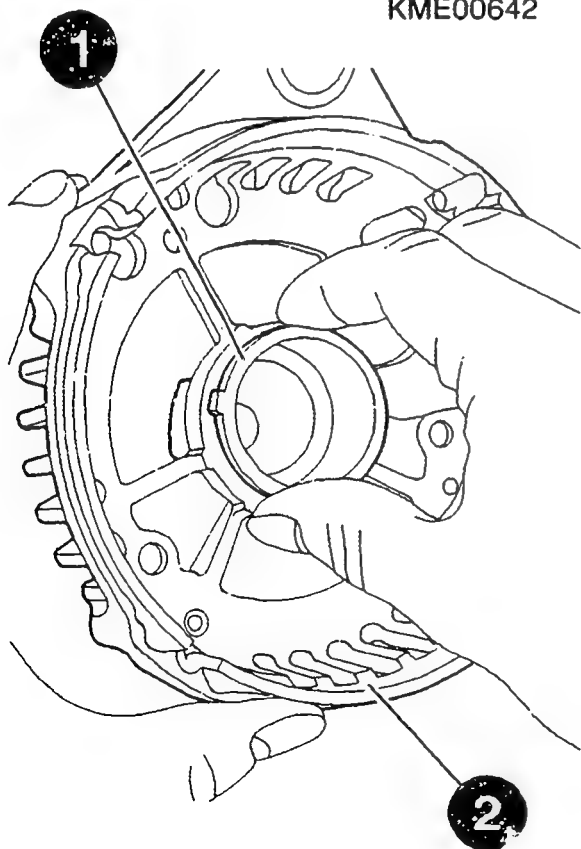
Insert new fitting ring (1) in collector ring end shield (2).

### NOTE:

In the case of fitting rings with collector ring protection, recess for carbon brushes must be located between the two tapped holes for regulator attachment.

Continue: I01/1 Fig.: III08/2

KME00642





# ALTERNATOR ASSEMBLY TABLE

Assembling deep-groove ball bearing of collector ring end shield	III10/1
Assembling deep-groove ball bearing of drive end shield	III12/1
Assembling rotor	III14/1
Assembling stator	III16/1
Assembling rectifier unit	III17/1
Assembling drive end shield and collector ring end shield	III21/1
Assembling regulator	III23/1
Assembling protective cap	III24/1
Fitting connections	III25/1
Assembling pulley	III26/1

Continue: I01/1

## ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing  
of collector ring end shield

Use is always to be made of a new  
deep-groove ball bearing.

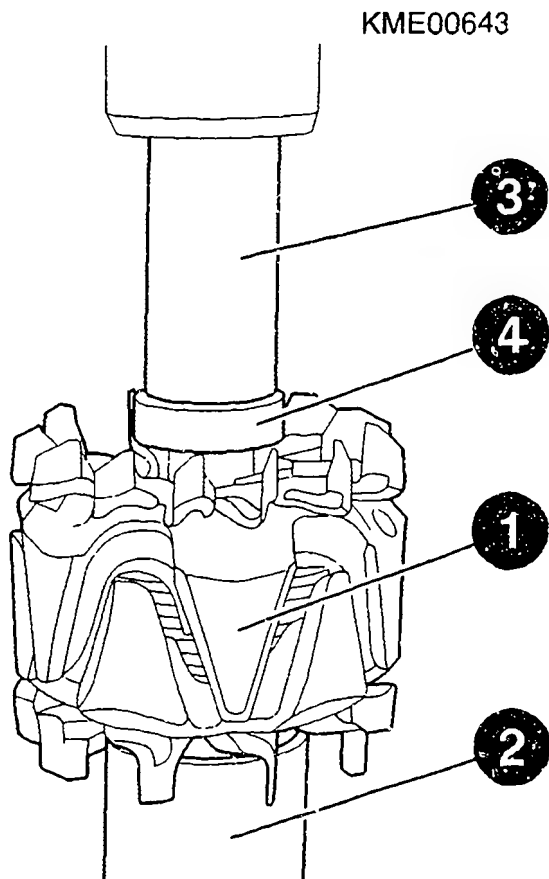
Mount drive end of rotor (1) on  
support piece (2).

Centrally align pressing-in sleeve (3)  
with new deep-groove ball bearing (4).

### ATTENTION:

Failure to center pressing-in sleeve  
may result in damage to collector  
ring assembly.

Continue: III11/1 Fig.: III10/2



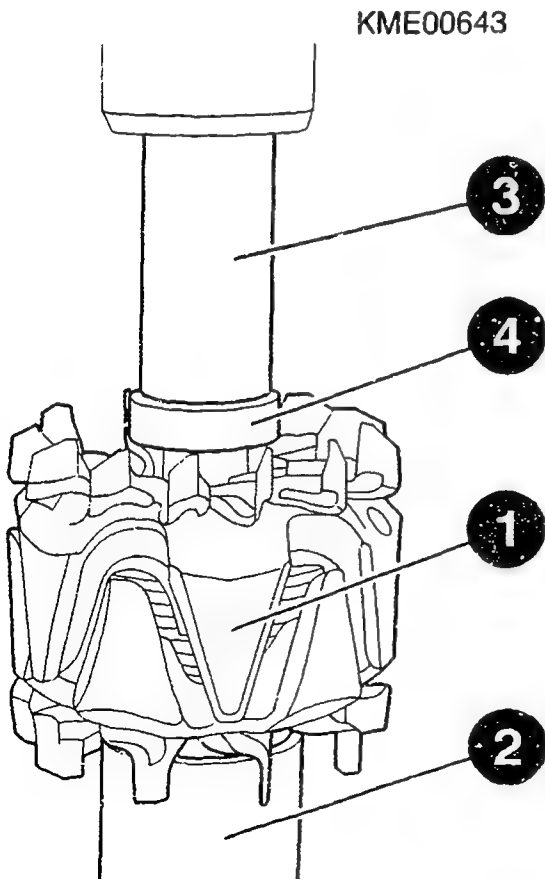
# ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing  
of collector ring end shield

Press home deep-groove ball bearing.

Mandrel press:	comm. avail.
Support piece and pressing-in sleeve:	0 986 618 162

Continue: III09/1 Fig.: III11/2



## ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing of drive end shield

Use is always to be made of a new deep-groove ball bearing, new bolts and a new cover plate.

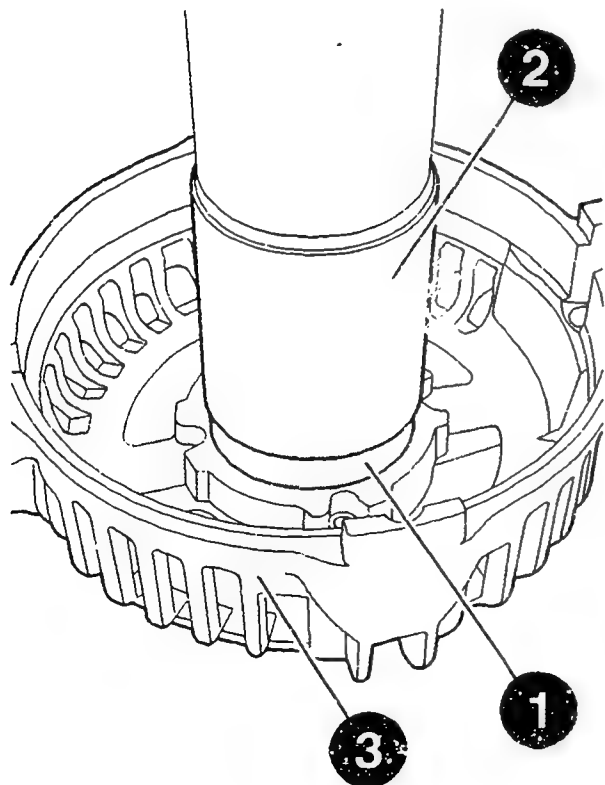
Press new deep-groove ball bearing (1) with support piece (2) into drive end shield (3).

Support piece:  
Mandrel press:

0 986 618 162  
comm. avail.

Continue: III13/1 Fig.: III12/2

KME00644



## ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing  
of drive end shield

Attach cover plate with four bolts (1)  
to drive end shield (2). Make use  
of torque wrench.

### NOTE:

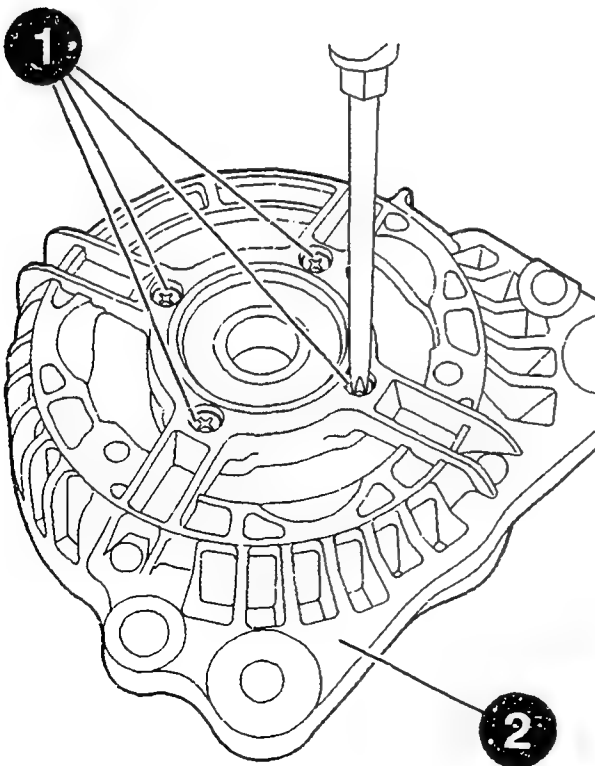
Collar of bolt holes of cover plate  
faces away from deep-groove ball  
bearing.

Tightening torque: 2,7...3,5 Nm

Torque wrench: comm. avail.

Continue: IIII09/1 Fig.: IIII13/2

KME00645



# ASSEMBLING ALTERNATOR

## Assembling rotor

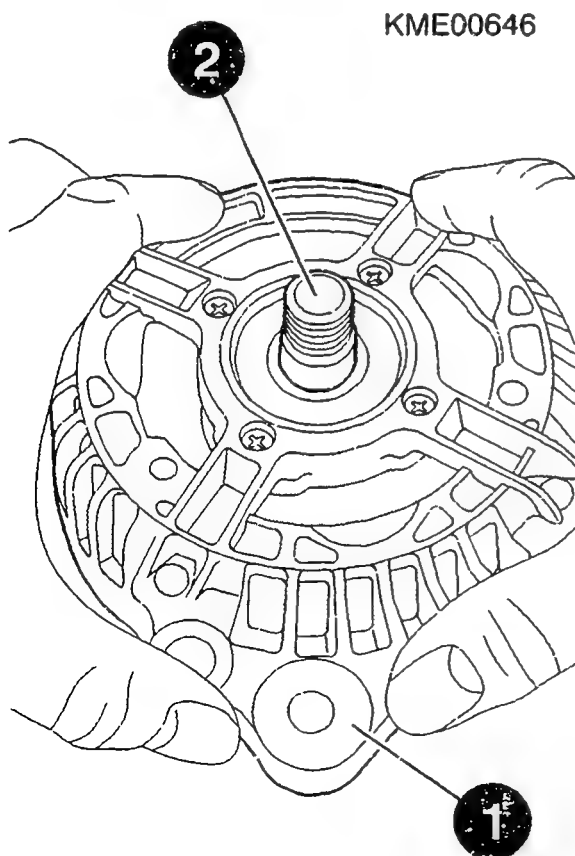
Insert collector ring end of rotor in support piece.

Slip drive end shield (1) onto rotor (2) by hand.

Support piece:

0 986 618 162

Continue: III15/1 Fig.: III14/2



# ASSEMBLING ALTERNATOR

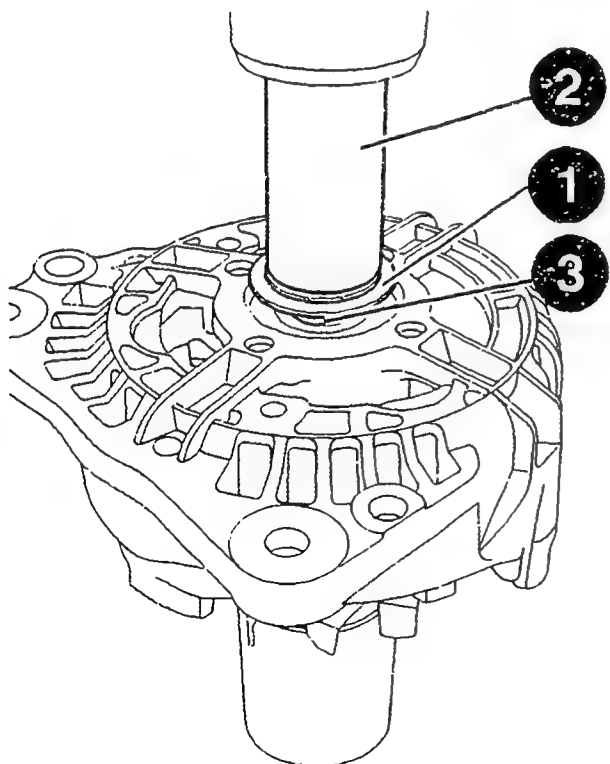
## Assembling rotor

Press spacer ring (1) (small collar facing deep-groove ball bearing, large collar facing pulley) with pressing-in sleeve (2) onto rotor shaft (3).

Mandrel press:	comm. avail.
Support piece and pressing-in sleeve:	0 986 618 162

Continue: III09/1 Fig.: III15/2

KME00647



# ASSEMBLING ALTERNATOR

## Assembling stator

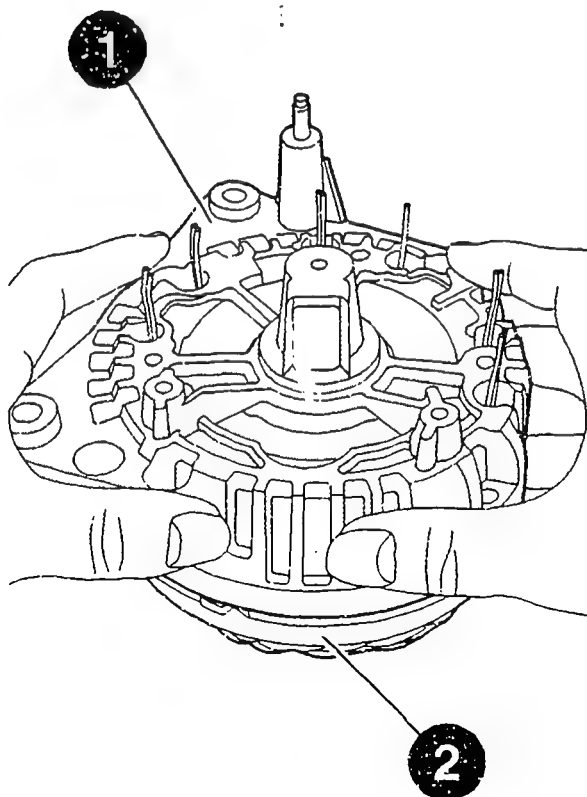
Render stator wires mechanically bright.

Position collector ring end shield (1) on stator (2).

Bend stator wires straight if necessary.

Continue: III09/1 Fig.: III16/2

KME00648





## ASSEMBLING ALTERNATOR

Assembling rectifier unit

Render stator wire connections mechanically bright.

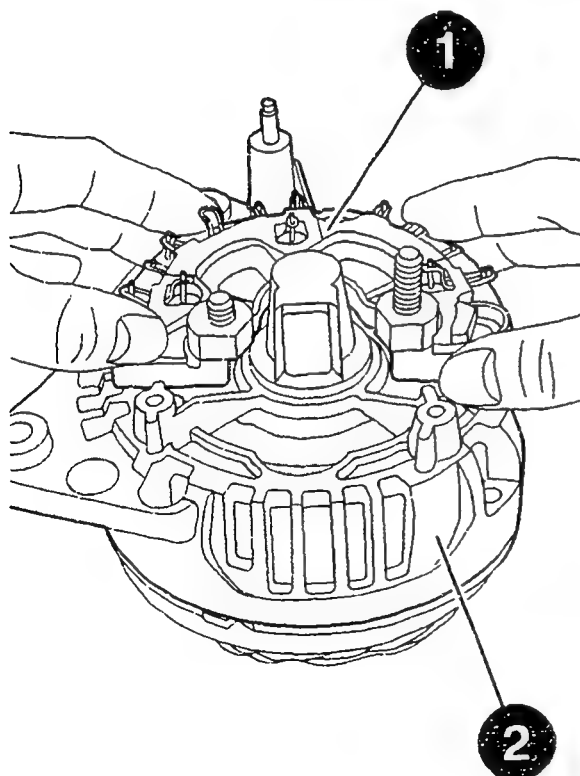
Position rectifier unit (1) on collector ring end shield (2).

### NOTE:

Ensure proper wire routing through stator wire connections.

Continue: III18/1 Fig.: III17/2

KME00649



# ASSEMBLING ALTERNATOR

Assembling rectifier unit

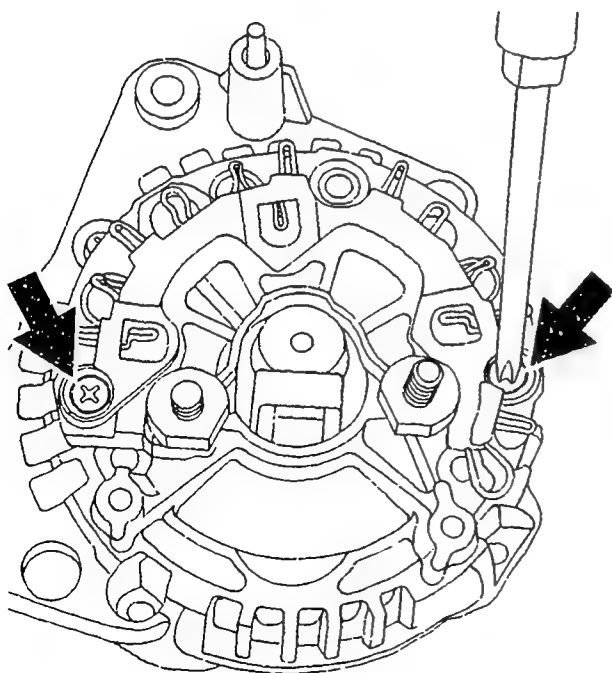
Use torque wrench to tighten bolts  
(arrows).

Tightening torque: 3,5...4,3 Nm

Torque wrench: comm. avail.

Continue: III19/1 Fig.: III18/2

KME00650



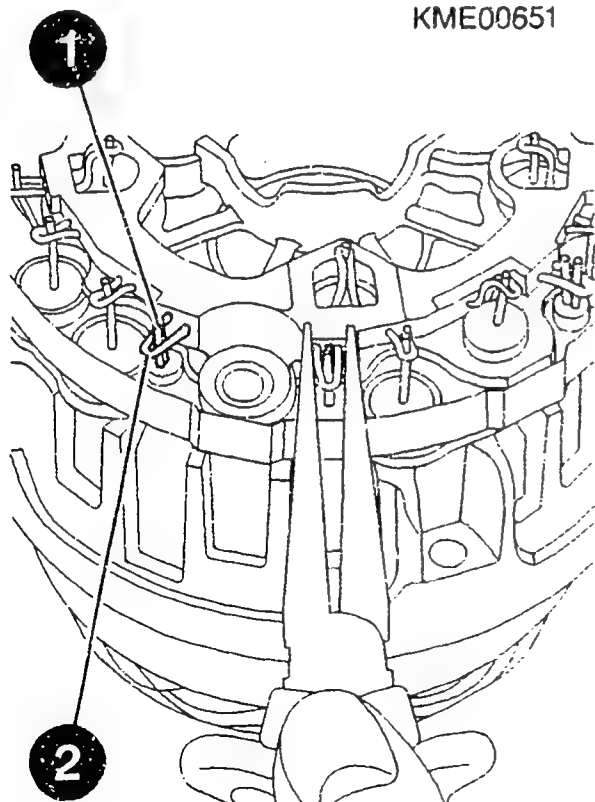
# ASSEMBLING ALTERNATOR

## Assembling rectifier unit

Fix stator wires (1) in position by squeezing together stator wire connections (2) at rectifier unit.

Continue: III20/1 Fig.: III19/2

KME00651



## ASSEMBLING ALTERNATOR

Assembling rectifier unit

Solder stator wires to stator  
wire connections.

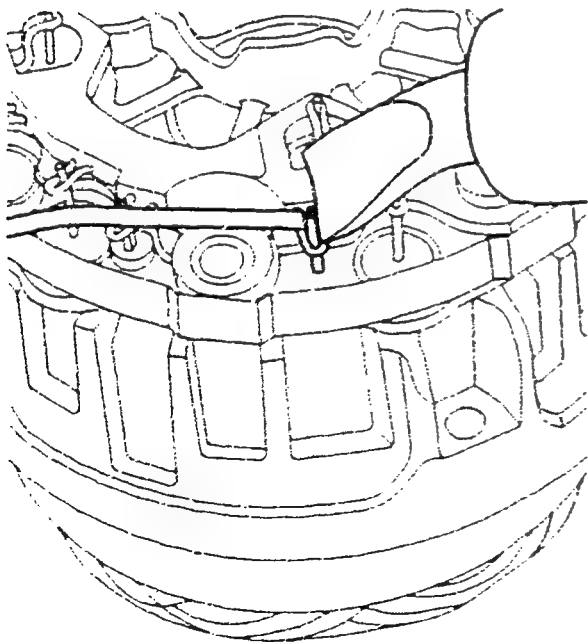
### ATTENTION:

Always make use of high-temperature  
solder (min. 480 C) and solder cream.

Soldering iron 180 W:	comm. avail.
Solder cream:	comm. avail.
High-temperature solder (min. 480 C):	comm. avail.

Continue: III109/1 Fig.: III20/2

KME00652



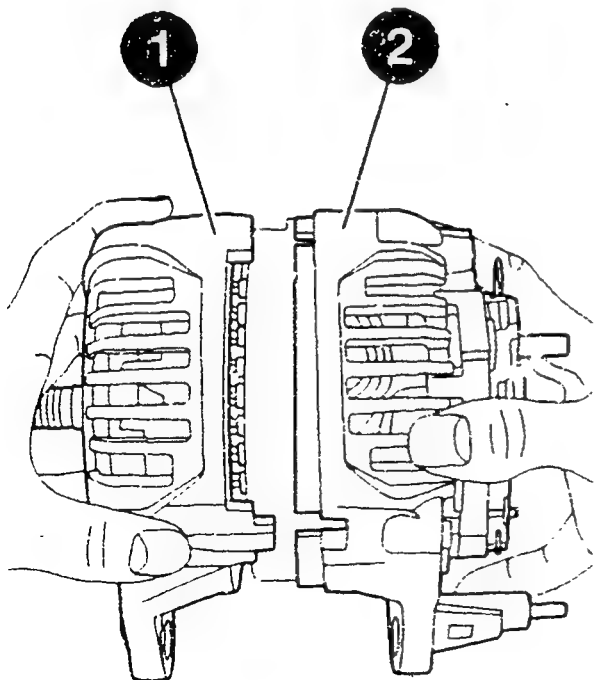
## ASSEMBLING ALTERNATOR

Assembling drive end shield and  
collector ring end shield

Insert rotor together with drive end  
shield (1) in collector ring end  
shield (2).

Continue: III22/1 Fig.: III21/2

KME00653



## ASSEMBLING ALTERNATOR

Assembling drive end shield and  
collector ring end shield

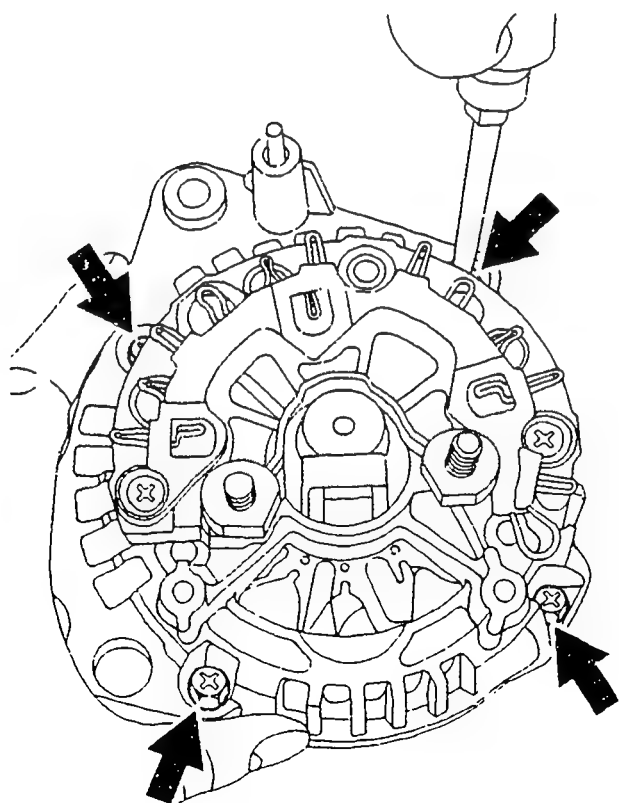
Fit bolts (arrows) and then tighten  
using torque wrench.

Tightening torque: 4,5...5,5 Nm

Torque wrench: comm. avail.

Continue: III09/1 Fig.: III22/2

KME00654



## ASSEMBLING ALTERNATOR

### Assembling regulator

Use bolts (3) to attach regulator (1) to collector ring end shield (2).

Use bolt (4) to attach connection V. Make use of torque wrench.

#### NOTE:

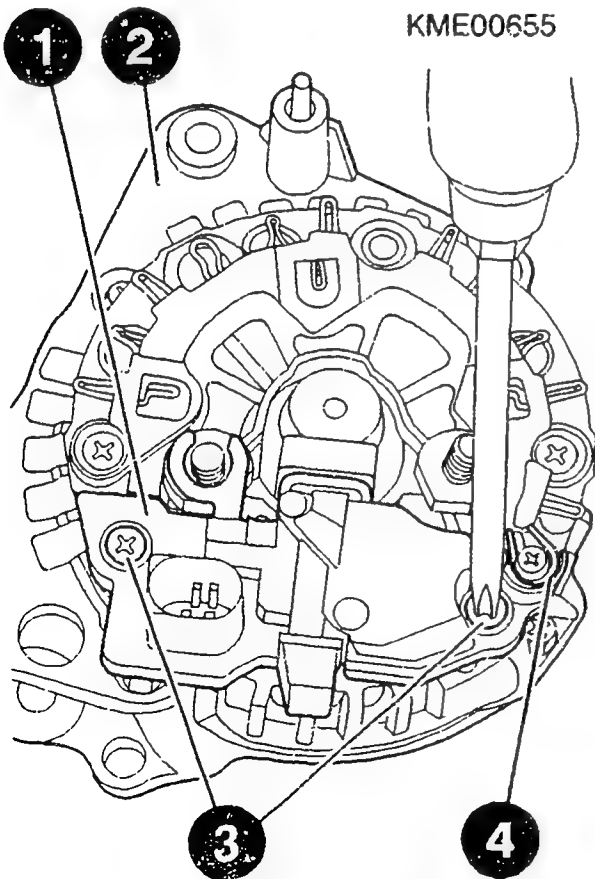
Pay attention to carbon brushes on installation.

#### Tightening torques

Regulator bolts:	1,6...2,3 Nm
Bolt for connection V:	0,9...1,4 Nm

Torque wrench:	comm. avail.
----------------	--------------

Continue: IIII09/1 Fig.: IIII23/2



## ASSEMBLING ALTERNATOR

### Assembling protective cap

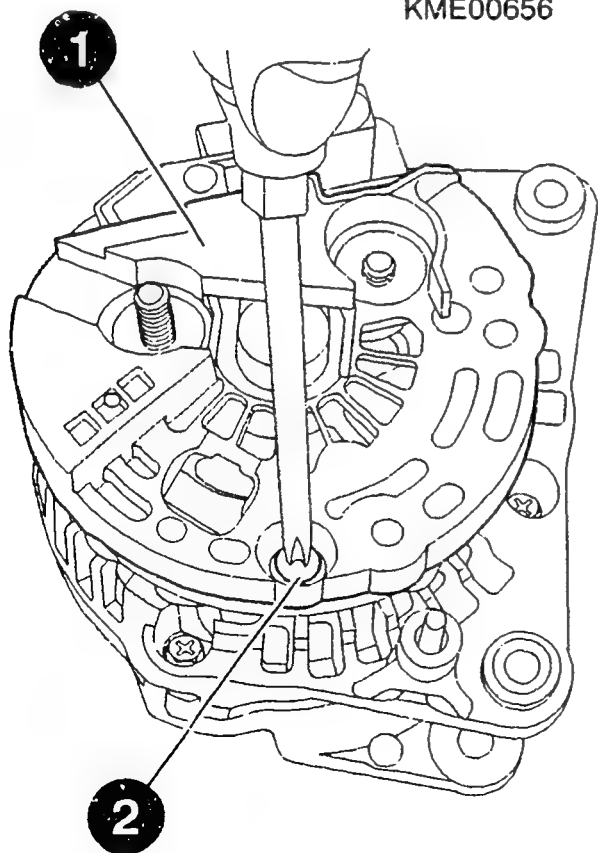
Attach protective cap (1) to rectifier unit and secure with bolt (2).  
Use torque wrench.

Tightening torque: 3,5...4,3 Nm

Torque wrench: comm. avail.

Continue: IIII09/1 Fig.: IIII24/2

KME00656





# ASSEMBLING ALTERNATOR

## Fitting connections

Attach connections long B+ (1), short B+ (2) and terminal W (if fitted).  
Use torque wrench.

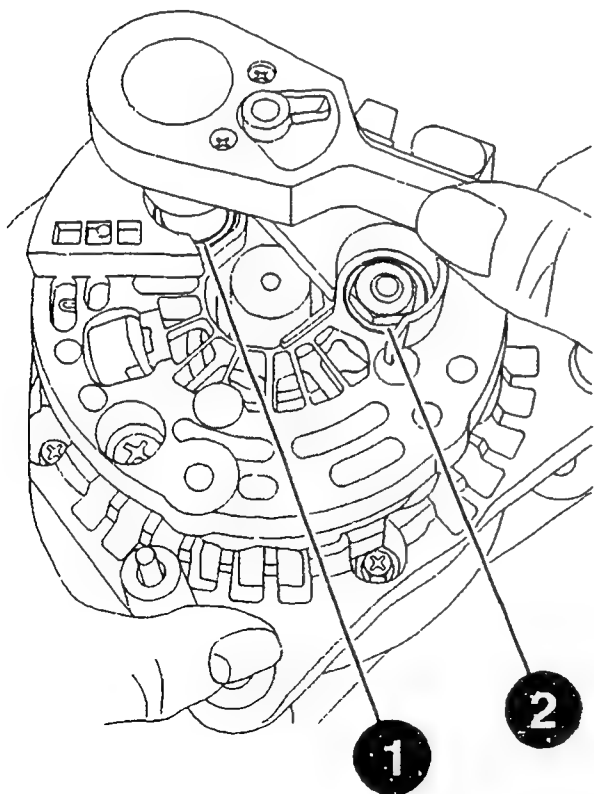
## Tightening torques

Long B+: 18...20 Nm  
Short B+: 11...13 Nm

Torque wrench: comm. avail.

Continue: III09/1 Fig.: III25/2

KME00616



## ASSEMBLING ALTERNATOR

### Assembling pulley

Attach socket wrench (1) to nut of pulley (2).

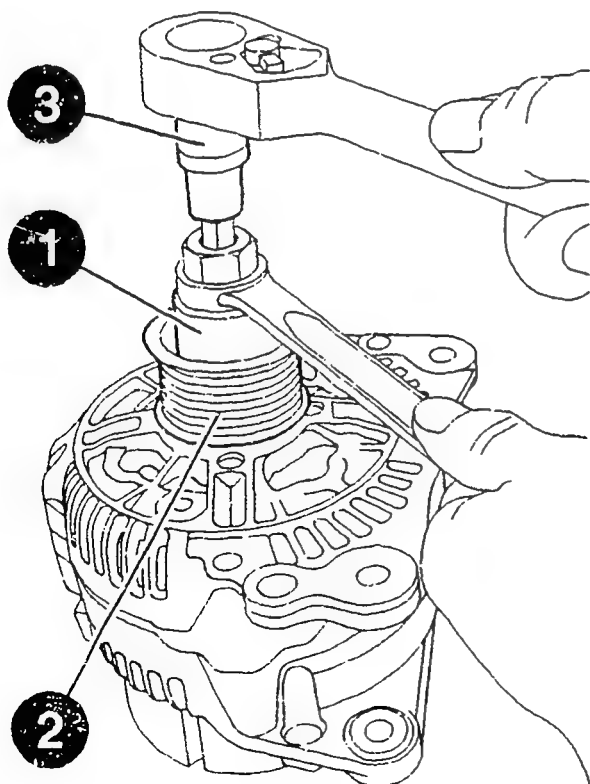
Hold rotor shaft of alternator with multi-point wrench (3) and tighten nut using 22 mm box wrench. Use torque wrench.

Tightening torque: 60...70 Nm

Torque wrench:	comm. avail.
Socket wrench:	0 986 618 152
M10 multi-point socket, long version:	comm. avail.

Continue: III27/1 Fig.: III26/2

KME00552



## ASSEMBLING ALTERNATOR

### Assembling pulley (free-wheel pulley)

Insert disassembly tool (1) in grooved tothing of free-wheel pulley (2).

Hold rotor shaft of alternator with multi-point wrench (3) and tighten free-wheel pulley by way of disassembly tool using 17 mm box wrench.

Use torque wrench.

Tightening torque:

75...85 Nm

Torque wrench:

comm. avail.

Disassembly tool:

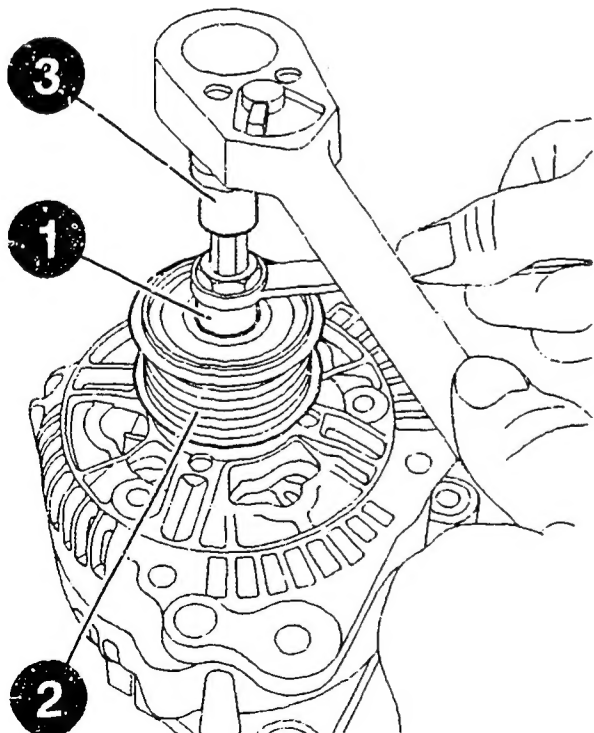
0 986 619 396

M10 multi-point socket,  
long version:

comm. avail.

Continue: III28/1 Fig.: III27/2

KME00553



# ASSEMBLING ALTERNATOR

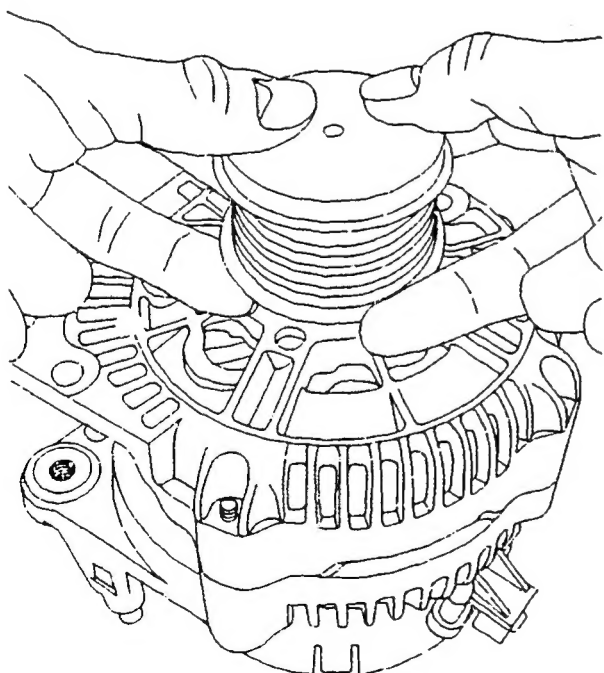
Assembling pulley

Cap is always to be renewed.

Fit clip-on pulley cap.

Continue: IV01/1 Fig.: III28/2

KME00597



# ASSEMBLING ALTERNATOR

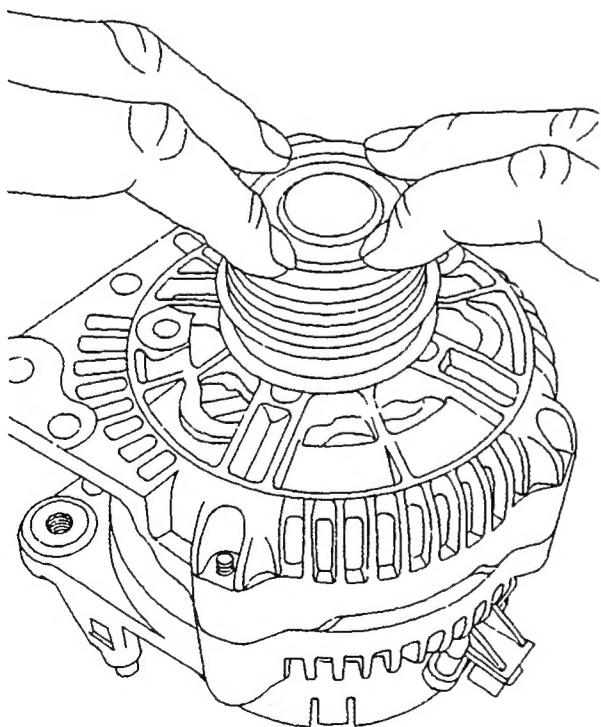
Assembling pulley

Cap is always to be renewed.

Fit press-in pulley cap.

Continue: I01/1 Fig.: IV01/2

KME00598



EDITORIAL NOTE

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